The Builder.

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Some Aspects of the Annual Report of the Local Government Board.

THERE is probably no department of the central administration which concerns the daily life of all sections of the population so much as the Local Government Board. The Report of this Board for the year 1894-95 shows very clearly how essentially this is the case, for the subjects with which the Board has dealt in the course of a single year's work are quite innumerable. No doubt to those who are in love with a very symmetrical form of administration, it is incomprehensible how local administration can work with central criticism. For it has to be noted that, in a very large measure, the Local Government Board in its dealings with local authorities is rather a critical and advising than a purely administrative body. The fact is very typical of our English habits, which manage to evolve practical satisfactory results out of what to many observers appears a medley of conflicting powers. For example, Urban Sanitary Authorities are primarily responsible for the administration of their districts. For this purpose, it is obvious that money is required. Yet these authorities must obtain the sanction of the Local Government Board before they can borrow money in order to carry out various works necessary for the fulfilment of their duties. In order to approve or disapprove a proposed loan, it is obvious that the Local Government Board have to go into all the circumstances of each particular case, and thus we have in reality two authorities—the Local and the Central—who have to carry out the execution of a particular work. The table which is printed in the annual report, and which shows the loans sanctioned by the Board to Urban Sanitary Authorities, exemplifies not only this dual form of administration, but the comparatively trivial matters into which the central authority must inquire. We may take some of the details of the loans as examples. Caermarthen has obtained leave to borrow 750*l.*, to be repaid in ten years, for the purchase of a water supply. Faversham has leave to borrow 800*l.* for the purpose of sewage disposal. Thus we go on with sums varying from many thousands—as, for example, in the case of Goole, which has borrowed 79,150*l.*—to hundreds; from really substantial to comparatively trivial sums. But there is a noticeable feature about this table. The sums, on the whole, which are borrowed are small, but the grand total is formidable: it reaches the substantial figure of four millions odd.

This sum is the more striking when we come to examine the interesting table also printed in this Report, which shows the annual amount of loans, the borrowing of which, by Urban and Rural authorities, has been sanctioned by the Local Government Board. In 1871 the amount was (in round numbers) 267,000*l.*, in 1881 it had risen to 2,500,000*l.*, and in 1891 to 3,281,000*l.* odd. It is certain that these annual amounts will continue to increase. On the one hand this is satisfactory. It shows that there is a substantial improvement taking place year by year in the sanitary condition of England, for these loans are largely employed for this purpose. On the other hand, this table also shows that the community has to bear heavy and increasing financial burdens, and that the very smallness of many of the sums borrowed is conducive to recklessness. We do not in the least deprecate the propriety of these loans; they are necessary for the execution of municipal improvements. On the other hand, these borrowing powers must be carefully watched, since it is obvious that while with one hand we are paying off the national indebtedness in the shape of the National Debt, on the other we are building up another national debt, just as onerous, in the shape of local loans.

We now turn to another point of special interest at the present time. We refer to buildings for the working classes. In respect to these an improvement seems to be obvious. In the first place, "applications were made to us during the year for our approval to schemes for providing new dwellings for persons of the labouring class proposed to be displaced by the acquisition of their dwellings under powers conferred by Local Acts and Provisional Orders." Some account of these schemes is then given. "At Dover the Town Council are to build twenty-five houses for the accommodation of a certain number of persons displaced as a result of street improvements." This is one instance only. Sometimes the body which is responsible for the scheme is a public authority, sometimes it is a limited company such as the London and North-Western Railway. But every such improvement means necessarily some advance in the sanitary condition of a locality, and a benefit to the working classes without any cost to themselves. At the beginning of this article we dwelt on the fact that the action of the Local Government Board in relation to local authorities was largely of an advisory kind. The following paragraph, which falls under the head of the work of the medical staff, is an admirable example of this phase of the influence of this Board. "In addition, conferences have been held at our offices with many sanitary authorities who have desired to avail themselves of the experience of our medical and architectural departments." These conferences were, of course, in addition to the various inquiries which have taken place all over England. The results of many of these inquiries, in the shape of the published reports of the medical officers of the Board, have been referred to from time to time in our columns. A separate report of the Chief Medical Officer forms a supplement to the general report, which alone fills a bulky volume.

We are dealing now, however, rather with certain aspects of the general work of the Board than with investigations into any one particular locality. Touching upon some of these more general points, it is interesting to note that inquiries into outbreaks of diphtheria were made in thirteen districts. The results of these inquiries, when there exist reasonably careful local authorities, can hardly have failed to produce an improvement in the health of the district. These inquiries were in addition to those made into the prevalence of other infectious diseases and into the sanitary condition of other localities. It is satisfactory also in this connexion to find that out of a total population of 29,000,000 in England and Wales the Infectious Diseases Notification Act had been adopted in districts the population of which amounts to 26,000,000. The Act, therefore, might well be made compulsory by Parliament; the vast majority of local authorities in England and Wales are in favour of it. It is unreasonable that it should not be brought into operation in the case of the odd three millions of people, since its non-existence among them must be attributed to the apathy or ignorance of a few local authorities whose action is adverse to the general good sense of the community.

We have in this article only touched upon some of the points in the work of the Local Government Board which are connected with subjects within the province of this

journal. The report itself is, in fact, a kind of social history of the country for the past year; it exhibits a large quantity of detailed and modest but most useful work done by this department. It shows also the practical capacity of the nation for getting its business done efficiently with the most unsystematic arrangements.

SALFORD SEWAGE SCHEME.

FOR six years Salford has been making experiments in sewage-purification; for a considerable part of that time the Mersey and Irwell Joint Committee has been trying to induce the borough to purify its sewage instead of merely making experiments; and during the last year the Manchester Ship Canal Company has indulged in expensive litigation to restrain the borough from emptying its sewage and sewage-sludge into the Canal. It is high time that something besides experiments was attempted, even though these be as valuable as the Borough Engineer, in a recent report to the Corporation, somewhat pompously declares—"the long series of experiments, on an unprecedented scale, by which you have done more than any other local authority to finally solve the sewage problem in manufacturing districts."

We are well aware of the advantages of careful consideration in the selection of a sewage-disposal scheme. Cynical people say that it is cheaper to make experiments than to purify the whole of the sewage; hence the wisdom of delay. But cynics are apt to distort the truth. Certainly there can be no doubt that those boroughs which have not yet adopted a purification system are gainers by their procrastination—they can profit by the experience of others,—but at the same time, the non-existence of an ideal scheme is no excuse for perpetual inaction. There is no perfect cut-and-dried system of sewage-purification, and there never will be. The composition of sewage varies too much for that: some is acid, some alkaline; some "strong," some dilute; the chief impurities in some are manufacturers' refuse, while in other sewage water-closet refuse and street-washings are the worst ingredients. In many districts, again, suitable land for treating the sewage naturally is available, while in others there is nothing but clay or rocky hills. Different circumstances call for different methods, and will continue to do so to the end of the chapter.

Out of the darkness, however, in which engineers and inventors groped so long, certain facts have been brought to light, which furnish guidance for the future, and to-day the main principles underlying sewage-purification are common knowledge. Chief of all the facts which have been discovered is the ultimate purification of the sewage by bacteria. The coarse particles in sewage may be separated in detritus-chambers; the sewage may be clarified and deodorised by chemicals; but the destruction of the foul organic matter must be accomplished by Nature's myriad hosts of microscopic organisms. Sewage-filters are now known to be but beds where these can breed, and factories where they can do their work. The material of which the filter is constructed is a secondary matter; sand and gravel, coke-breeze, broken brick or stone, burnt ballast, will serve, not equally well perhaps, but approximately so, and quite sufficiently well to render the expensive filtering materials, of which so much was heard a few years ago, a drug in the market.

A scheme embodying the main principles of sewage-purification has at length been adopted by the Corporation of Salford, acting on the recommendation of their Engineer, Mr. Corbett. It is a scheme of chemical precipitation followed by filtration. The quantity of sewage which it is calculated to treat is twelve million gallons a day. The actual precipitant is not yet decided upon; it is comparatively unimportant: "There are so many chemical systems," says Mr. Corbett, "any of which might serve our purpose, that I need not attempt to select one now." Sulphate of iron and lime will probably be used. The sewage, after receiving the chemicals, will pass along a channel with five precipitating-tanks on each side, each tank having an area of about 1,000 square yards. The tank-effluent will then be passed rapidly through "roughing-filters," of which six are provided, having a total area of 2,040 square yards. These "roughing-filters" are a somewhat novel feature, although not the first of their kind.

Allowing for one being out of use (for purposes of cleansing, &c.), the flow of sewage through them will be about 7,000 gallons per square yard per day, but it is calculated that they will be able to deal with three or four times this quantity on occasion. These filters will remove a considerable proportion of the suspended matter from the tank-effluent, and from them the sewage will pass to the filters proper. The principles on which these have been designed are tersely stated by Mr. Corbett. "The essentials of an efficient sewage-filter are," he says:—

"1st.—A hard, granular, durable material, free from very fine particles; such as sharp sand with the finest grains riddled out, or coke breeze, or cinders, or crushed brick, with the fine dust riddled out.

2nd.—Arrangements for intermittent use, with thorough drainage and aëration in the intervals of rest, at least once a day, and preferably many times a day.

3rd.—A flow of not more than 1,000 gallons per square yard per day while in use, with 5 ft. depth of filtering material."

The filters as designed by Mr. Corbett have an area of 20,640 square yards, "providing for the filtration of twelve million gallons per day, at the rate of 582 gallons per yard of total filter area." This is scarcely a fair way of calculating the flow through the filters, as only two groups of filters will, as a rule, be in operation at the same time, the third being at rest; the actual flow through each yard of filter when in use will be 872 gallons. Space has, however, been provided for an additional group of filters—a wise precaution. A sand-washing engine will be provided for washing and opening up the sand, and Mr. Corbett estimates that, "it will be found necessary to wash the top layer of filtering sand every six months, the next layer every twelve months, and the bottom layers every two years." The effluent from the filters will pass into a "fish-pond"—this sounds delightful!—and thence over a long weir into the Ship Canal.

The *crux* of the sewage problem still remains to be considered—the disposal of the sludge. The precipitation tanks already exist, and are to be adapted to the new scheme. In order to remove the sludge without emptying the tanks, Mr. Corbett has designed a novel arrangement of a travelling scoop, &c., a rough model of which has been in operation successfully for some time; it may, therefore, be expected that the arrangement properly carried out will fulfil its purpose. A different arrangement for the same purpose has, we may add, been adopted in an old rectangular tank at Swinton, and at the time of our visit appeared to work well. But the sludge itself? Like London, Salford sends it out to sea in barges. If the Manchester Ship Canal has done nothing else it has found an outlet for Salford sewage-sludge.

NOTES.

THE more the question of the street from Holborn to the Strand is studied the more it becomes obvious that its almost necessary corollary is a new bridge across the river, between Waterloo and Blackfriars Bridges. A mere glance at the width of the new street in the proposed plan, and the width of Waterloo Bridge, renders it evident that the result of the formation of the new street must be to pour upon Waterloo Bridge more traffic than its width of roadway can accommodate. Of course the solution of the problem from the engineers' point of view is a perfectly simple one—to wipe out Waterloo Bridge and put one of their own hideous steel structures in its place. An engineer would probably do this without the slightest compunction, and we may as well warn those who care about one of the grandest structures which any city in the world can show, that Waterloo Bridge is in danger, and will be removed if public opinion is not strongly and definitely pronounced on the subject. The design for the proposed new street ought to include a design and provision for a new bridge, as the only satisfactory treatment of the case.

THE election of Sir John Millais to the office of President of the Royal Academy will be generally recognised as being not only the most satisfactory selection, but the only selection that could be made, admitting the fact that he was willing to accept it. That he should do so now is rather a compliment on his part to the Academy than one on their part to him, and many persons, with ourselves, had the feeling that a post could hardly be offered to him now which it might have been supposed he had a full claim to many years ago. But under any circumstances we are very glad to hear of the appointment, and to congratulate the Royal Academy on their selection.

AFTER a sufficiently long period of criticism of a design not yet in existence, the works for the new Gare des Invalides at Paris have at last been taken in hand, and pushed on with such activity that the terrace work is already nearly completed. The station, which will form the real terminus of the lines from Brittany and Normandy, will rise little above the ground level, but it is probable that at the two sides of the esplanade there will be two buildings erected, kept as low as possible, which will form approaches to the underground station, and will be connected architecturally with the Palais des Invalides, with which object they are to be designed in pure Louis Quatorze style. This part of the scheme is not, however, finally decided on yet. By this arrangement the esplanade itself will be left quite clear, and there will be nothing to interfere with the view of the palace, which will form the background of the projected grand avenue of trees. The whole result will probably be very good, and the Government may be congratulated on having compelled the engineers in this case to bow to a strictly architectural treatment of the site.

NEXT month elections to the Parish Councils throughout England will take place, and the first year's work of these new bodies will come to an end. It is clear that for the present they will have little effect on the condition of rural localities, and in regard to sanitation they seem unlikely to bring any influence to bear in the direction of improvements. The tendency of these bodies has so far been not to undertake any work which is likely to call for the expenditure of any public money; nor have they, speaking generally, shown any desire to criticise the sanitary work of the District Councils. So far, indeed, as regards sanitary progress in the rural districts, it is becoming more and more evident that some kind of general and periodical inspection of dwelling-houses is required if sanitary defects are to be remedied. There are scores of cottages all over England with the most pronounced sanitary defects, to which the local inspectors pay no attention. Indeed, if it were not for the intervention from time to time of the Local Government Board, and the fear of this central authority, sanitary progress in the rural districts would come to a standstill.

MR. RITCHIE'S Light Railways Bill proves to be, as recent official utterances had foreshadowed, a long stride in advance of previous legislative proposals

on this subject. Not only is a Government subsidy to be offered in the case of districts unable to obtain sufficient local assistance, but a definite sum (1,000,000*l.*) is to be set apart for this and other purposes connected with the Bill. These include Government loans, subject to 3½ per cent. interest, to supplement the contributions of local authorities; and altogether the scheme of State financial aid may be described as a bold and novel one. The new departure will perhaps be viewed with a certain degree of apprehension. A careful consideration of the pros and cons of State control will generally convince most thoughtful people that it is most undesirable to permit the thin end of the wedge to be inserted in this country. But the present government appreciate this probably as much as anyone, and they may be trusted to frame their Bill accordingly. While Sir Albert Rollit doubts if the amount named will prove sufficient, and another M.P. alludes to it as "a paltry sum, altogether inadequate," another critic of Mr. Ritchie's proposal has estimated that the million pounds subsidy might enable 1,200 miles of light railway to be constructed to start with. In any case, if there is really that demand for these light lines we have been told there is, there should be something like a scramble for the offered grants.

THE Financial Secretary to the Treasury has issued a useful *résumé* of the Civil Service Estimates, for which Parliament will have to vote the money during the present Session. In regard to Works and Public Buildings, there is an increase of 125,000*l.* odd over the same branch of the Estimates for 1895. It is probable that this increase ought to be larger. It is noticeable that 5,700*l.* is to be spent on the defective water-supply of Windsor Castle; 3,000*l.* is required for urgent sanitary work at the Royal College of Science, 8,000*l.* for necessary sanitary improvements at various public offices, 20,000*l.* is required for a new laboratory and sanitary works at Somerset House. These sanitary works have obviously been put off as long as possible, and we have no doubt that there are similar works which ought to be undertaken without delay. We are glad to see that 247,000*l.* is to be spent on new Post-offices in some places, and repairs and enlargements to similar buildings in other districts. There is great need for such works, since there are any number of offices which are now too small for the business transacted at them; in many the accommodation for the *employés* is far from being adequate from the point of view of health. There should be no unreasonable economy in taking in hand defective Post-offices all over Great Britain. Considering the wealth of the country, our Post-offices are in many places a national discredit.

SIR A. ROLLIT'S Bill to introduce a formal system of Conciliation in Trade Disputes, and the Bill of the Government on the same subject, have now been referred to the Grand Committee on Trade. It is probable, therefore, that an Act on this subject will become law in the course of the present Session. It is likely, however, that the form of the present Bills will receive considerable modification. Though any steps towards the prevention or the early ending of trade disputes must be cordially welcomed, we confess that we are not very sanguine that an Act to introduce a formal system of conciliation is likely to have a large result. There is no difficulty now in obtaining the services of competent and fair-minded men to bring the parties to a trade dispute together, or to act as arbitrators. The difficulty is to bring the disputants to a frame of mind in which they are willing to ask for the advice of third parties. When once they are willing to invoke outside aid the system of conciliation or arbitration is of little importance. It is the reasonable spirit of compromise and peace which it is difficult to produce, and no Act of Parliament can create it.

AN interesting paper on "The Building Stones of the United States," by Dr. Wm. C. Day, is published in the last issue of the *Journal of the Franklin Institute*, from which we glean that the stone-quarrying industry of the States dates back only to the beginning of the present century, though stone had been employed in a few edifices prior to that period. Marble quarrying commenced in 1800 at New Milford, Connecticut, but the subsequent competition of the well-known marble from Rutland, Vermont, had the effect of shutting down the earlier workings. Slate quarries were opened in 1812 at Slateford, in Pennsylvania. The year 1825 saw the commencement of the gigantic granite industry of Quincy, Massachusetts, when the stone was selected for the construction of the Bunker Hill monument. Much of the historic matter, we notice, is obtained from Mr. Merrill's work "Stones for Building and Decoration," National Museum, Washington. The author proceeds to give a few statistics concerning the American quarry trade in 1894, which are, apparently, from advance sheets of the annual "Mineral Statistics"—seeing that the last-mentioned work has not yet arrived at official quarters in London. During that year the marble production was valued at 3,199,585 dollars, nearly one-half of which came from Vermont; but this figure does not represent the total marble consumption, for a great deal is imported, especially from Italy. From what we have seen on the spot, we quite endorse Dr. Day's remark that the texture of the white Vermont marbles is not as good as that of Carrara, though that is not the prevalent American opinion. The value of the slate production during the same year was 2,790,324 dollars, more than one-half of which was raised in Pennsylvania. Limestone other than marble is also largely raised, the total value for 1894 being computed at 16,500,000 dollars, which figure includes not only building stone, but road-metal, blast-furnace flux, &c. The methods of quarrying are glanced at, and the author rightly observes that the scientific examination of rocks, for the purpose of determining their structure, is an exceedingly important matter in connexion with the question of determining the applicability of the materials to various economic uses. In regard to durability, chemical analysis is stated to be of comparatively little value, and the use of the microscope is insisted upon. It is gratifying to observe that this view, which we enunciated in these columns many years ago, and have frequently referred to since, is now obtaining almost universal recognition.

A SOMEWHAT novel method of electric lighting has been used in the new building for the Union Bank of Australia at 71, Cornhill. Mr. Cuthbert, the architect, has designed an electrolier in the shape of a bronze dish tinned in the inside, and which can be suspended from the ceiling by two bronze tubes 6 ft. in length. Inside this dish there are three 25-candle-power lamps, the light from which is reflected to the ceiling and then diffused about the room. The main hall of the bank is lit by twenty-four of these candelabra, and the effect is distinctly good. So well is the light diffused, that when a pencil is held upright on a sheet of paper, no shadow can be observed. As no direct light from the lamps can be seen the eye is not dazzled, and so the work of the clerks is made easier and pleasanter. The system of lighting by means of inverted arc-lamps has been known for many years in this country, and has been employed with success in many workshops and factories, but this is one of the first applications of the reflection of light from incandescent lamps from the ceiling for illuminating purposes. The loss of light due to reflection from a whitewashed ceiling is not so much as is generally supposed. Mr. H. E. Harrison, the consulting electrical engineer to the bank, proved, by experiments made at Faraday House, that the loss was only about 20 per cent., and as the light is more diffused the pupil of the eye is larger and so the apparent illumination may be better. In the corridors Joel incandescent lamps are used, the lower parts of the glass globes of which are silvered, so that the light is thrown on the ceiling and then reflected downwards, the effect being an improvement on the ordinary way of using frosted globes. Altogether the lighting of this bank is thoroughly well done, and contains examples of all the best modern methods of employing electricity for illuminating purposes.

IN delivering the prizes at the Sheffield School of Art a few days ago, Mr. J. D. Crace observed that the success of the School was in a great measure due to the fact that there was a strong local interest felt in it and in its ends and purposes; that they had kept before them the true object of encouraging and promoting design rather than mere drawing, and had preserved the local independence of the School. He laid stress on this, he said, because many a school of the kind had lost the greatest part of its local value, and its national value too, through being allowed to drift into the vortex of official centralisation. "Dependence upon a Governmental grant was fatal to a school of art. It became a mere drawing school, and not a good one." We entirely concur in the spirit of these remarks. Mr. Crace has enforced a consideration which very much needed enforcing. "The Department," well-intended as its system no doubt was, has become a kind of national mill for grinding out a certain standard of drawing. That may be better than nothing, as long as its actual degree of value is correctly appreciated; but it is not teaching design.

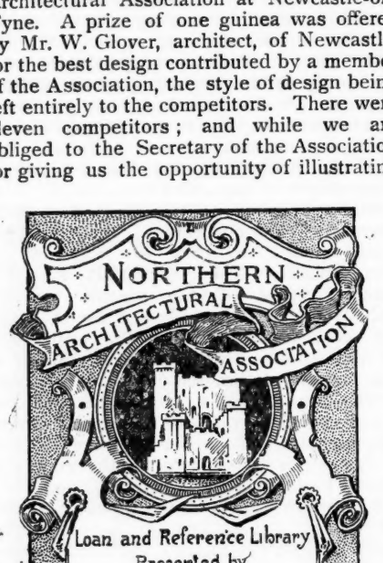
IN Dr. Murray's second Royal Academy lecture on Friday last week he drew attention to a portion of the frieze of the Theseion, where certain deities are looking on at a combat, as illustrating the difficulty under which the sculptor lay in having to carve deities visibly to the eye of the spectator, and yet to suggest that they were invisible to the other figures in the composition. Where the background of such a frieze was coloured, as it probably was in this case, some assistance might be given by a different colour surrounding the group of deities, otherwise the sculptor could only convey the idea by the expression of the deities and their entire separation from the tumult of the combat. A bas-relief about two centuries later, the visit of Dionysos to the house of Icarius, showed how entirely the notion of invisibility of the deities had altered; the deity was here entering the house as an ordinary visitor, a visible personage, only of superhuman stature. This idea of the larger size of the deities might have arisen from the frequent use of colossal statues in the temples. In the frieze from one of the treasuries at Delphi, of the earlier epoch (*circa* 550 B.C.) there was the same idea as in the Theseion; the earthly combatants fighting, the gods ranged quietly on each side as invisible though not uninterested spectators. Other noticeable points were the introduction of the waiting horses of the combatants as a kind of sculptural break between the groups of men and gods, and the curious fact that though the horses were grouped as chariot-horses, neither chariots nor harness are indicated. In another subject from the same building however, the attack of Cybele on the giants, the car was shown, and the harness of the lions (Cybele, Dr. Murray suggested, being too great a goddess to dismount and fight on foot), and one of the lions was shown as having seized a giant by the waist and neck. As Cybele herself appeared to have no weapons, this frieze suggested for the first time the idea that

Cybele did not drive her lions, as had been usually supposed, merely as draught animals, but as weapons of war—an idea not suggested in any Greek sculpture previously known. At his third lecture on Monday last Dr. Murray called attention to the treatment of the deities in the Parthenon frieze, pointing out how in this case also they were evidently supposed to be invisible to the rest of the figures, the connexion of which was kept unbroken on either side of the groups of seated deities. He also pointed out how these deities were grouped so as to combine on one side of the centre those who were specially connected with Athens, on the other side those who presided over the world irrespective of favoured localities. Touching then on the sculpture subjects of the pediments, he supported the view that in the west pediment, the conflict between Athene and Poseidon, the subordinate figures were all those of superhuman personages interested in different ways in the conflict, which was not therefore a mingling of deities and mortals, as in the frieze; and maintained the title of "Ilyssus" as the most suitable and probable for the well-known recumbent figure near the right hand end of the composition, in spite of other suggestions of modern criticism.

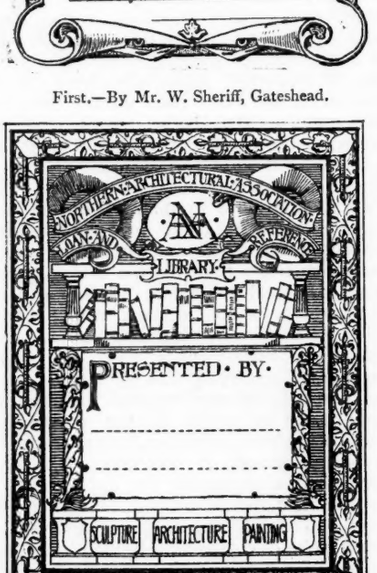
THE design for the figure on the proposed new French postage-stamps has just been completed by M. Grasset, the painter who received the commission from the "Postes et Télégraphes" Department, and has been submitted to the Government. It is much superior in style and composition to the stamp now in use. It shows the figure of a woman, her head encircled with foliage, symbolising France. The shoulders are covered by a cuirass, partly hidden by drapery. The right hand is on the pommel of an antique sword, the left holds an olive-branch. A scroll above the head has the word "Postes," and a scroll below the words "République Française"; the value of the stamp is indicated on an escutcheon on the right of the upper portion of the vignette, which is completed by the republican "attributes" of a fasces crowned with a Phrygian cap and laurels. There is room, perhaps, for improvement in the way of simplification of the design; but at all events, between the old and the new design there is all the difference between a work of art and a mere trade mark.

A SMALL but very fine collection of works of the Barbizon school of French painters is on view at the Goupil Galleries. Among these are nine small works of Corot, two or three of which are quite exceptional in beauty; a small landscape by Daubigny, "Andrésy on the Oise," which is remarkable both for its artistic completeness as a composition, and for a style and texture quite unlike (we should say superior to) Daubigny's usually flatter and more delicate style of execution; and a grand painting by Diaz, in Fontainebleau Forest, which in its abstract and idealised style, as well as powerful handling, justifies all the enthusiasm with which Diaz is regarded by those who know him at his best—an enthusiasm not, it must be admitted, quite explained by a good many of his small works. A painting by Troyon in his "cattle-piece" style, "Going to Market," shows most learned drawing in the foreshortened animals (look at the white cow especially, and the way it is built up, as it were, plane behind plane); and the simple work by Jacque, "Return of the Flock," is one of the best examples we have seen of this minor master of the school; in fact if Jacque had always painted like this, he could hardly be regarded as a painter of the second rank; the picture is rather exceptional for him. We strongly advise those who care for what may be called the intellectual order of landscape painting to visit the exhibition if only to see the large painting by Diaz, which is alone worth a visit.

WE append reduced fac-similes of the two designs which have been placed first and second in a little competition for a book-plate to be inserted in books presented to the Library of the Northern Architectural Association at Newcastle-on-Tyne. A prize of one guinea was offered by Mr. W. Glover, architect, of Newcastle, for the best design contributed by a member of the Association, the style of design being left entirely to the competitors. There were eleven competitors; and while we are obliged to the Secretary of the Association for giving us the opportunity of illustrating



First.—By Mr. W. Sheriff, Gateshead.



Second.—By Mr. R. P. Twizell, Newcastle.

Designs for Book-plate for the Library of the Northern Architectural Association.

the two designs selected as the best, we must honestly confess that, considering the amount of artistic fancy which has often been brought to bear lately on the designing of book-plates, we think the designs somewhat behind what might have been expected in a book-plate competition among architects. They are in good taste, but want invention. The first one is certainly the best; the second is too precise and square in its lines. A book-plate should suggest play of line.

AN architect sends us a copy of the programme issued to architects by the Exeter Church Extension Committee, for a competition for a proposed new church in St. Thomas, Exeter. The committee offer a premium of 100*l.* for the set of drawings considered by them to be first in merit, and 25*l.* each for the next three designs. But by the eighth clause of the instructions the set of plans to which the 100*l.* premium is awarded "shall become the property of the committee," and by the final clause they do not bind themselves to adopt any of the plans sent in. The architect who may obtain the 100*l.* premium has therefore, potentially, sold his design to the committee to do what they please with it; to carry it out themselves with the assistance of a clerk of works, thereby saving themselves two-thirds of the architect's fee (the church is to cost 6,000*l.*), or to have it carried out by another architect. The committee may say that they do not intend to do this, but the terms of the competition leave them power to do so, and no architect will like to put himself in that position.

ROMANESQUE ARCHITECTURE.*

BY PROFESSOR AITCHISON, A.R.A.

I HAVE said nothing about the curiously shaped chapels and baptistries, as they were mostly of Roman or Byzantine shapes, and domed. In the lower story of the Palace of Augustus at Rome, supposing always that it was of that time, there are chambers on the ground floor, which are very Byzantine in shape, and in which Augustus is supposed to have heard causes. As early as the days of Marcus Aurelius Antoninus (reigned 160-180) the Prætorium of Mousmieh, Central Syria, was precisely like a church or chapel with a nave, aisles, an apse, and two sacristies, which had a high quadrangular vault over its central compartment. In the Baths of Constantine, at Rome, there was a small chamber in front of the great Laconicum of quatre-foil shape. I have little doubt that most of these shapes were constructive, for with vaults you must abut them properly, or they will fall down. A barrel vault has a uniform outward thrust on both sides of its whole length, a groined vault has thrusts only at the meeting of the groin points, and a dome or annular vault has a thrust all round. If you have apses with half-domes, the inner faces of which support a dome or a lantern, then the weight of this counteracts the inward thrust.

Although the Byzantines were not the inventors of pendentives (as these are found at the Baths at Caracalla, and are probably of Persian origin), yet they were the perfecters of them, and also, I believe, the inventors of squinches, mostly corbelled one over another, and also of the conch, shell, or half-dome over an angle, cut off by the re-entering angles. Pure corbelling was also resorted to where the domes were small or where they were turned over octagons, and small projections only occurred over the angles. It is said that eighty-one domes fell at Constantinople during the stay of Constantine there, which only lasted for seven years; so the architects of those days had plenty of opportunity of investigating the causes of failure. The great constructive achievement of the Byzantine architects was the erection of domes on drums, so that in the countries that had been overrun by the barbarians architects conversant with the construction of domes could always be got from Constantinople for important buildings. We cannot therefore credit the Romanesque architects with any of the inventions or improvements of the dome, until the time when they used ribs to support a thin shell. Their great constructional invention was the turning of pointed and groined vaults with ribs over the naves of churches, and the securely abutting them by flying buttresses. Still these chapels and baptistries were a feature in the countries where Byzantine and Romanesque architecture prevailed. We have the baptistry of Novara in Italy of the fifth century, an octagon with very thick walls, lightened by alternate square and half-round niches, and covered with an octagonal dome supporting a small lantern. In Syria, there was the baptistry of Mondjelia, a half-octagon with a square end, the half-octagon being hypæthral and of the fifth century. The celebrated baptistry of St. George at Ezra of the fifth century was an oblong, with a projecting half-hexagon, containing the internal apse, and with the dome over the inner octagon of oval section; supposed to have given rise to the central domes or lantern towers over the altars in subsequent churches. There is the celebrated Byzantine church of St. Sergius with its sixteen-sided and fluted vault or dome, and San Vitale at Ravenna, both of the sixth century. Cattaneo believes parts of the Sta. Fosca at Torcello to be of the ninth century, although enlarged in the eleventh century. Charlemagne's chapel in his Palace at Aix is said to have been built at the end of the eighth and the beginning of the ninth century by St. Wandrille, a monk from Fontanelle; but there is also a tradition that

* Being the fourth Royal Academy Lecture on Architecture this Session. Delivered on Monday evening, February 17, 1896.

Charlemagne had Byzantine architects sent him, as well as columns and marbles plundered from Ravenna. The central octagon of this chapel is domed with an octagon dome, and is supposed to have been copied from San Vitale at Ravenna, which was said to have been copied from Constantine's Golden Temple at Antioch, and this form of Charlemagne's chapel was repeated at the church of Ottmarsheim, in Alsace.

To continue the oddly-shaped churches, chapels, and baptistries, I may mention the church of Germiny-des-Prés, which was square, with four apses, one in the middle of each face, of the ninth century; the quatre-foil baptistry of Biella, in Italy, which Cattaneo believes to be of the ninth or tenth century; the chapel of St. Croix, at Munster, Switzerland, which has a nave with an apse at the end, and two apses forming the transept, so as to make an oblong with a trefoiled end, said to be of the eleventh century; a similar one of the Trinity, at the Island of St. Honorat of Lerins, said by Viollet-le-Duc to be of the seventh or eighth century; and the Chapel of St. Germain, at Querqueville, near Cherbourg, of the eleventh century; St. Croix, at Montmajour, near Arles, a quatre-foil with a porch in front, of the eleventh century.

The church of the Holy Sepulchre at Jerusalem was built by Constantine's orders, in the form of a basilica, the whole end being formed into an apse; this was destroyed by Chosroes, with the aid of the Jews, about 616 A.D. It is supposed to have been restored or rebuilt by Heraclius, but all that now remains is supposed to be the restoration or re-building by the Crusaders somewhere about 1130 A.D. The main purpose of the Crusades was the recovery of the Holy Sepulchre; in rebuilding the apse they made it circular, added a nave, with an apse at the other or east end. The circle surrounding the sepulchre with its aisle became a favourite shape for churches all over Europe. The crypt at St. Benigne, at Dijon, at the beginning of the eleventh century, is believed by Viollet-le-Duc to be an imitation of the west end of the Holy Sepulchre, and is supposed to have had three stories of aisles, and the centre octagon to have had a sort of reversed hypæthral funnel in imitation of the cedar roof of that at Jerusalem. The church of Neuvy-Saint-Sepulchre, founded in 1045, is circular, with a circular aisle, two stories in height, and is supposed to have been finished in the twelfth century, and there are several others in France. The church at St. Gereon, at Cologne, is a copy of the whole of the Holy Sepulchre. The Templars, who were specially the defenders of the holy places at Jerusalem, affected this form of church, and we know that the church of Little Maplestead, the Temple church in London, and St. Sepulchre's at Cambridge, were built in imitation of the west end of the Holy Sepulchre. Were it not that Constantine's original basilica of the Holy Sepulchre had the Sepulchre surrounded with an arcade of little more than a half-circle prolonged by straight lines, the church at Bozrah, in the Hauran, and St. Stephano Rotundo, at Rome, might be thought to be imitations of its end.

One of the striking features in Romanesque churches was the towers, mostly called bell towers, although the early ones are not supposed to have had bells. We know that Martial speaks of the bath bell in one of his epigrams (lib. 14, ep. 163), although we do not know its weight.

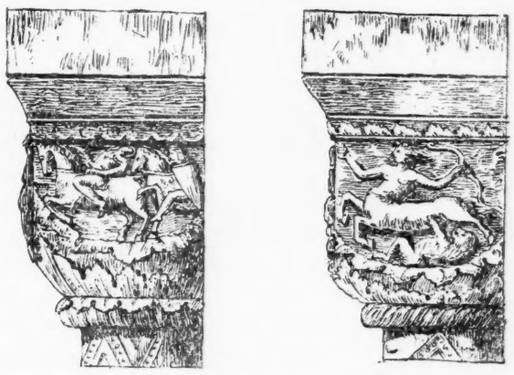
The early church bells were small, and were fitted in wooden belfries, or in bell-cots on the gables, although it is said that there were bells in some of the Romanesque towers as early as the seventh century; but it was not until the eleventh or twelfth century that large bells were used. The biggest in the eleventh is said to have weighed about 23 cwts., and one in the twelfth about 26 cwts. It is, however, believed that though the towers were found convenient for bells, that was not their original object, but that they were or a double purpose—first, as watch-towers; and secondly, as distinguishing marks of churches. The feudal castles had keeps that were high above the general level, and proclaimed the seat of a great vassal; most of the abbeys were held in fief, and the clergy not only wanted a watch-tower, but also desired to have a distinguishing feature like the castles. From the fact that the upper part of the towers formed an outline against the sky, great pains were taken to make the outline both original and elegant. It is also believed that the spire was a Romanesque invention. In the early towers it seems to have been an ordinary pyramid like that crowning the tomb of Mausolus. The substance of the early pyramids was very massive, like that of the tower at Ver, Calvados, built at the beginning of the eleventh century, but eventually the substance of the spire was made nearly as slight as that of the Gothic spires.

Some of the early towers at the beginning of the eleventh century, such as that at Périgueux, had circular tops, like the upper part of an oil flask, standing on a circular peristyle of columns. At the end of the eleventh century this motive at Périgueux was repeated, but with much more elegance, in the belfry of the Abbaye des Dames at Saintes, over the crossing of the nave and transept, where a square arcaded stage bears a circular stage above, also arcaded and buttressed with cylindrical buttresses, with a flask-shaped spire. Each course of the spire is ornamented with a sort of semi-circular antifixæ. At Brantôme, there is an isolated bell-tower built on a rock, with seven sets off in its height, with all the external faces upright, but inside, the walls embracing the fourth and fifth sets-off, are built with a single batter. The sixth story is wholly arcaded, but is stiffened by the gables over the central opening below, running up into the seventh story. The top is crowned with a pyramidal roof. Some of the bell towers became arcaded octagons in the last two stories below the spire.

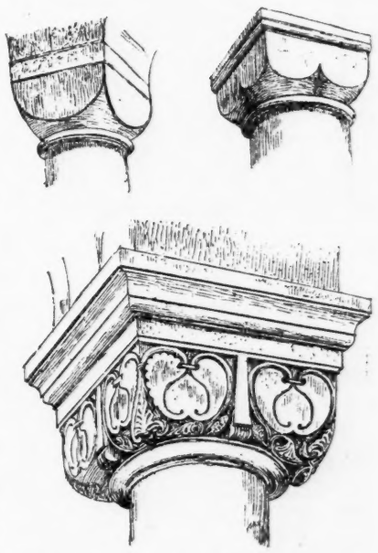
There is a curious bell tower of the end of the eleventh century at the Cathedral of Puy-en-Velay, of seven sets off below the spire. The top stage is less than half the width of the bottom of the tower, and the upper part is carried by four isolated piers. Its outside has some strongly marked Saracenic features. I have never seen this bell tower, and therefore criticism is impossible, but the drawing shows that it has the grave fault of looking as if the upper half had been packed inside the lower half.

The Norman doorways are mostly round-headed, and, except in the very early examples where the archivolts are merely plain stepped, are strikingly original in their ornamentation, and mostly have the crowning member and the archivolt below it highly ornamented with bold ornament; in fact, I think it may be safely said that all the Norman architectural ornament is bold, masculine, and effective. In one sense it is original, *i.e.*, we do not know where some of it came from, and even when we can tell where it came from, it was used so judiciously that it may be looked upon as forming an original style of ornament. The ornament on the jambs of a doorway to the Palace of Sultan Beybars at Cairo much resembles the character of Norman work, and may have been taken from it, for Durham was vaulted, and Bayeux built in the twelfth century. Beybars reigned from 1260 to 1277. The ornament on the door consists of intersecting arches formed of roll mouldings with sinkings between. A great deal of the Norman flat ornament was either pure Byzantine or Saracenic Byzantine. Some Norman ornament has, in my opinion, never been surpassed for effectiveness and vigour. It is not easy to convey definite impression by vague terms of praise. Let us take one sort of capping or cymatium of an outer archivolt to a doorway: it is mostly, if plain, a wide fillet with a splay below. This splay is sometimes ornamented with small segments of spheres, half their width apart, sometimes with bits of half-round moulding nearly as wide apart as they are long. Sometimes there is a fillet with a torus under it, instead of the splay, and this is often twisted. Sometimes the capping consists of two rings of narrow half-circles like tiles breaking joint, the flat parts being tangents to the circle. The varieties are too numerous to mention. One only is particularly striking, a series of small arches that finish on a roll. The archivolts themselves are covered with mouldings in zig-zags or chevrons (*bâtons rompus*), or by outlines of frets, or by lozenges. And if there are two archivolts of these bold patterns the intermediate ones are plain or moulded, or with scrolls, or with sunk Byzantine ornament cut into stars by facets.

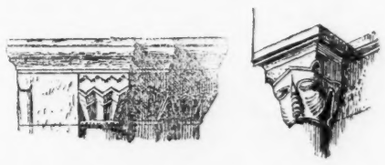
It has occurred to me that the heads on some of the archivolts, of which there are two rows at the west door of Iffley, and which occur at Bayeux and elsewhere in France, were suggested by the heads of foxes or wolves that may have been nailed round the doorways of their native huts.



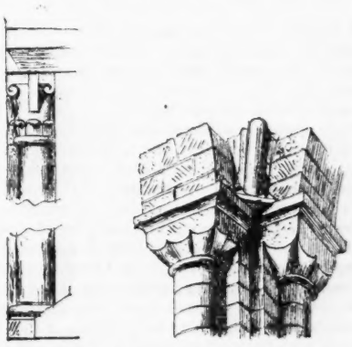
Iffley Church, Oxon.



Rosheim, Strasburg (XIIth Century).

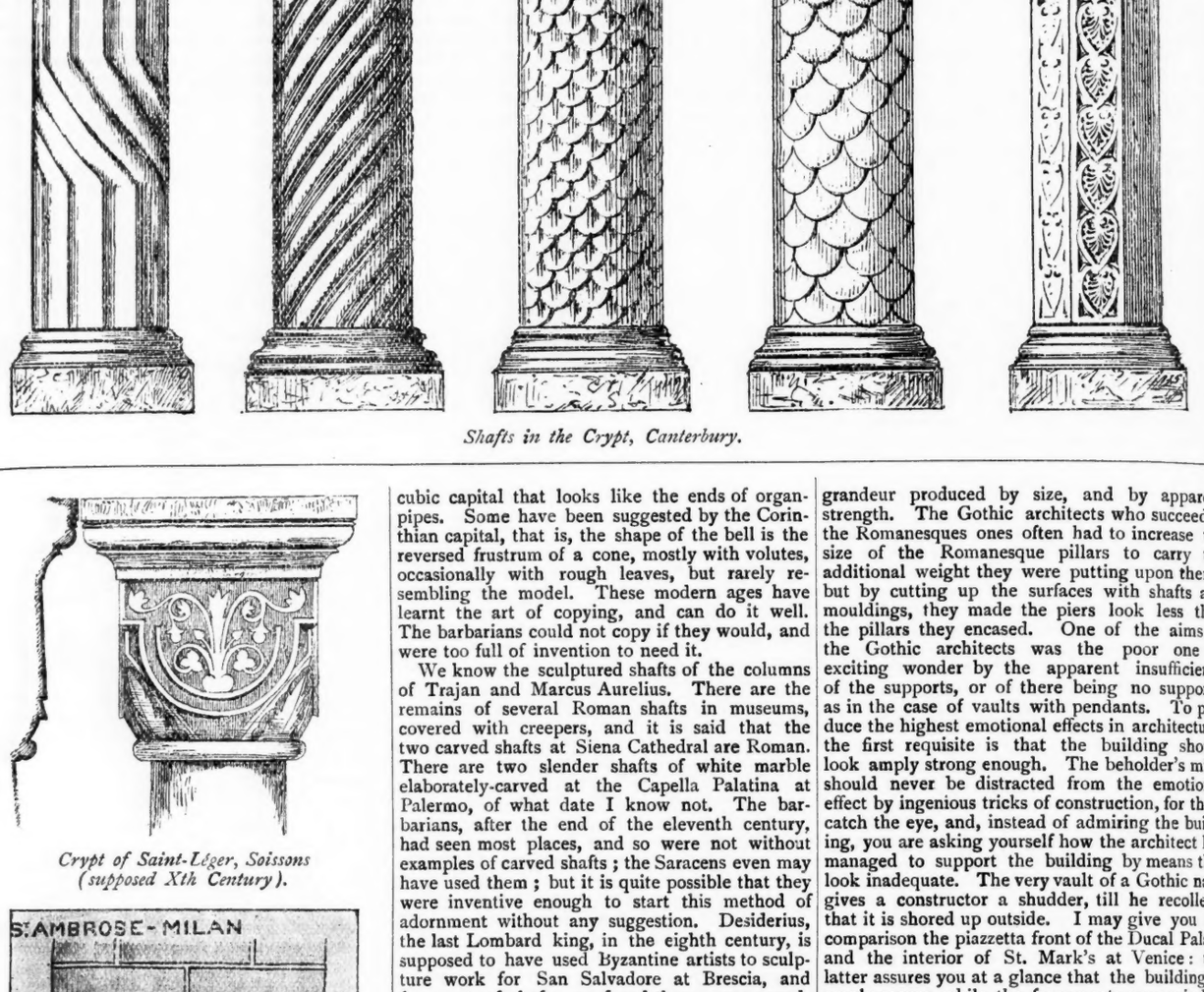


Peterborough.

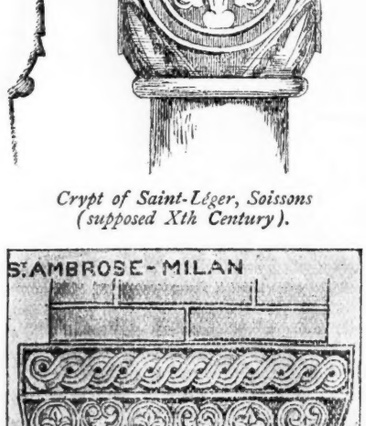


Quilly, Calvados. *Romsey.*

Some of the Norman capitals of the eleventh century are comic. The upper part of the bell of a Corinthian capital above the lower row of leaves is turned into a rough face; the thick plain abacus is the forehead, the small volutes under



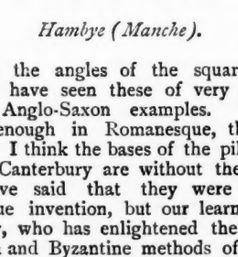
Shafts in the Crypt, Canterbury.



Crypt of Saint-Léger, Soissons (supposed Xth Century).

it make the eyes, and a projecting oblong in the middle makes the nose. A few capitals to large pillars are rough imitations of a Doric column; only the abacus is circular, and the echinus or ovolo is often carved into a rope, and in France there are a few of the Cubic capitals. The Cubic capital may be taken as a large square block of stone, somewhat wider than the shaft; on each face a semi-circle is turned with its centre at the top, under the abacus. The lower part is then worked away to fit the circle of the column. To the best of my belief these capitals are first met with in Constantine's great cistern at Byzantium, called the Thousand and One Columns. Some have the semi-circle on each square face carved with figures or floral ornament, and below the capital is just eased off into the circle of the shaft, and left plain, but at Iffley this part is covered with foliage. A few have a capital I take to be of purely Norman origin that is formed of the head of some wild beast or dragon that has the shaft in his mouth. A few are of that cubic variety that has two instead of one semi-circle on each face, but most have that cubic capital that looks like the ends of organ-pipes. Some have been suggested by the Corinthian capital, that is, the shape of the bell is the reversed frustrum of a cone, mostly with volutes, occasionally with rough leaves, but rarely resembling the model. These modern ages have learnt the art of copying, and can do it well. The barbarians could not copy if they would, and were too full of invention to need it.

We know the sculptured shafts of the columns of Trajan and Marcus Aurelius. There are the remains of several Roman shafts in museums, covered with creepers, and it is said that the two carved shafts at Siena Cathedral are Roman. There are two slender shafts of white marble elaborately-carved at the Capella Palatina at Palermo, of what date I know not. The barbarians, after the end of the eleventh century, had seen most places, and so were not without examples of carved shafts; the Saracens even may have used them; but it is quite possible that they were inventive enough to start this method of adornment without any suggestion. Desiderius, the last Lombard king, in the eighth century, is supposed to have used Byzantine artists to sculpture work for San Salvadore at Brescia, and fragments of shafts are found there, some round, some octagonal, wholly covered with wicker-work patterns or with floral arabesque. You see Norman pillars spirally-fluted covered with zig-zags, or with ornamented bands forming diamonds, and the diamonds panelled; or the shafts are imbricated or fluted, partly with vertical and partly with spiral flutes; and when the shafts are octagonal they are panelled on each face, and filled with floral patterns. There is a feature in some Romanesque bases which seems to show a new departure: the claws at the angles of the lower torus which seem to spread the



Hambye (Manche).

weight to the angles of the square plinths. I think I have seen these of very rude form in some Anglo-Saxon examples. They are common enough in Romanesque, though not universal. I think the bases of the pillars in the Crypt at Canterbury are without them, and I should have said that they were a purely Romanesque invention, but our learned friend, M. Choisy, who has enlightened the world on the Roman and Byzantine methods of building, says he found examples at Diocletian's Villa at Spalato. I have seen nothing more imposing than those vast pillars, at Durham Cathedral, chevronned or spirally fluted. The vast nave in which they stand looks as if it had been built for a race of giants, and was meant to last for ever. The barbarians, even when they became partially civilised, rarely forgot the effect of grandeur produced by size, and by apparent strength. The Gothic architects who succeeded the Romanesques ones often had to increase the size of the Romanesque pillars to carry the additional weight they were putting upon them; but by cutting up the surfaces with shafts and mouldings, they made the piers look less than the pillars they encased. One of the aims of the Gothic architects was the poor one of exciting wonder by the apparent insufficiency of the supports, or of there being no supports, as in the case of vaults with pendants. To produce the highest emotional effects in architecture, the first requisite is that the building should look amply strong enough. The beholder's mind should never be distracted from the emotional effect by ingenious tricks of construction, for these catch the eye, and, instead of admiring the building, you are asking yourself how the architect has managed to support the building by means that look inadequate. The very vault of a Gothic nave gives a constructor a shudder, till he recollects that it is shored up outside. I may give you for comparison the piazzetta front of the Ducal Palace and the interior of St. Mark's at Venice: the latter assures you at a glance that the building is amply secure, while the former sets your mind at work to see how the heavy-looking wall is supported on lacework. At Strasburg Cathedral, that piece of Romanesque work by the apse so captivates you by its solidity and grandeur that you neglect the wirework of the rest and merely look at the storied windows.

In the ornamental parts, too, the Romanesque architects had not cast aside all care for the past and contempt for precedent; they sought to improve and to perfect the lessons of the past. The north doorway of the west end of Rouen Cathedral and the south porch of Chartres Cathedral are, in my opinion, infinitely superior to anything done afterwards.

The only Norman church I know in London is St. Bartholomew-the Great at Smithfield. All the Norman part, though a trifle rude, is dignified and majestic. The Gothic windows of the clear-story are so poor and slight that they suggest that the building had been let to a sash-maker, and he had put in some of his own Gothic sashes to get light for his workmen.

Nothing is more praiseworthy in ordinary buildings than carefully adjusting every part to the work it has to do; but public monuments should be treated with a more lavish hand; we not only want them to be strong enough for the purpose, and the present, but to look as if there was enough and to spare. At a banquet we ask for profusion. In the case of public monuments superabundant strength is not superfluous. The inroads of time are constantly weakening the structure, and that which was only strong enough when new, is not strong enough after a few hundred years, and this is specially the case when the weakened parts are necessary for the preservation of the whole structure. The degradation of flying buttresses by time threatens the destruction of the whole edifice. In this respect the monuments of Greece and Rome are worthy of imitation, many of which still remain for our edification and delight, though uncared for many hundreds of years.

THE ARCHITECTURAL ASSOCIATION.

THE ordinary fortnightly meeting of this Association was held on the 21st inst., in the Meeting-room of the Royal Institute of British Architects, Mr. W. D. Caröe, M.A. (President), in the chair.

Mr. F. D. Culver was elected a member of the Association.

A donation of a parcel of books by Mr. E. Woodthorpe was announced, and a vote of thanks was passed to him for the gift.

The President announced that the first meeting of the class of Elementary Ornament and Colour Decoration would be held on Thursday, March 5, under Mr. Alfred H. Hart, the lecturer. The fees would be reduced from 1*l.* 1*s.* to 10*s.* 6*d.*

A vote of thanks was passed to Mr. Sidney Smith for conducting a party of the members over the National British Gallery, and for kindly providing refreshments.

Mr. Arthur Silver then read a paper on "The Modern Stencil," part of which we print on another page, and the remainder of which we are compelled to hold over until next week owing to pressure of other matter. In the discussion which followed,

The Chairman, in inviting discussion, expressed pleasure at seeing several members of the Art Workers' Guild present, and hoped they would take part in the discussion on the paper.

Mr. Lewis F. Day proposed a vote of thanks to Mr. Silver for his paper, which showed him to be not only an enthusiast in the subject, but, what was more, a thorough workman. There were two kinds of stencilling, of which Mr. Silver had specially mentioned only one. Stencilling, apart from being independent work, was a sort of subsidiary work largely used in decoration, and as such it was a valuable assistant in all forms of mural decoration. In that case there were no laws of stencilling. One could do what they pleased, the only thing being that one must not be found out. But when it came to stencilling proper, he agreed practically with everything Mr. Silver had said. He had insisted on the ties, and they were the main points, for a stencil which did not depend upon its ties was absurd. The ties could be masked to a considerable extent, and he had seen designs in which the ties were so cleverly treated in this manner that it took an expert to make out that they were stencil patterns at all. This was rather over-shooting the mark. It suggested the Japanese method of using threads to some extent to hold the stencil together, and so getting rid of the ties. He thought this was objectionable. In the case of a letter "O," treated as Mr. Silver suggested, there would be an appearance as if the central disc were suspended in mid-air. Mr. Silver had rightly insisted that one of the charms of stencilling lay very much in the variety of colour to be got, but that was not a new idea. As far back as he could remember, every decorator who knew his trade—he referred to the better class decorator—did vary his colour more or less in stencilling, and it was mainly "duffers" who did the kind of work Mr. Silver had shown them at the commencement of his paper. The novelty of what Mr. Silver had shown them lay very much in the application of the process to textile fabrics. There was good and bad in that. Mr. Silver had rightly said that oil and stains were the most satisfactory materials for working on these fabrics. At the same time he did not, himself, quite like oil on textiles. He felt that oil was not quite the right thing to use, and he objected to distemper on textiles. With dyes Mr. Silver had done some admirable work; but there was something to be said for colour-printing. The colour-printer also could "fake" his blocks, and get variety of shade, as the Japanese printers had shown. He did not know the dyes Mr. Silver had used, for he had not given himself away to that extent. The thinning of colour for stencilling led to the results shown on the walls, with their gradations and softenings; but if the oil-colour was thinned in the ordinary way, his experience was that it deadened a good deal, and the thinner the colour was made the more liable it was to blacken and lose its pristine purity. With regard to the utility of textiles to be fixed on walls—it was true that one could remove a textile fabric and fix it somewhere else, but, as a matter of fact, one never did that; it would seldom fit another room. He could not help feeling that, with regard to wall decoration, if people wished to stencil, the proper thing was to stencil direct on the walls. The stencilling process was peculiarly adapted to use for small quantities, and that was where the advantage came in, but he did not see the extraordinary superiority of stencilling over equally skilful block-printing for very small quantities indeed, and it was hardly worth while cutting stencils. If one had to dodge about to fit the different lengths of the room and adapt the stencil to its several parts, it implied a tremendous amount of work—so that the thing might just as well be done freehand. This was especially the case with regard to such a design as the "Flight of Birds." He thought altogether that Mr. Silver claimed too much for his stencilling. The Japanese block printer could "fake" his block, and the tapestry weaver could get infinite variety. As to mosaics, much as he admired the work they saw exhibited on the walls, it did not quite obliterate the memories of Ravenna. He did not think so badly as Mr. Silver of English colour. English colour was infinitely better than French or German colour. He denied altogether the supremacy of French colour. No doubt the French taught something that we did not teach. They taught their designers, for one thing, to draw in body colour, putting in every touch clear and crisp, so that the man who had to work from the drawing could read and produce it. Manufacturers complained very much that English designers did not follow that course, and there was no doubt that the French beat us there. They also beat us in the technique of elaborately delicate colour-printing, but when it came to colour itself, he denied that their work was a patch upon ours. The French colour was generally crude and garish, and the best of it was seldom more than pretty and delicate, seldom rising to dignity or real beauty. There was not a French decorator living who could compete for a moment with Burne-Jones, if his very life depended upon it. The French seemed to have no taste in colour. Mr. Day concluded by saying that, with regard to manuals of colour Mr. Silver knew, as well as he did, that adequate coloured illustrations were out of the question in a book at anything like a moderate price—and that, unless you could show colour, it was of no use talking about it—and not much then.

Mr. Gleeson White, in seconding the vote of thanks, said he fancied that the Japanese, to whom we were very much indebted for the modern stencil, had been rather badly treated. They had been regarded as if they were merely the inventors of hair ties for small patterns, and it had not been taken into consideration that they were the first people, so far as he knew, to use an elaborate system of stencilling in colour upon fabrics. Anything which tended to novelty of design he hoped would, in the long run, turn out for the best, and it seemed to him that perhaps the most important point in this stencilling was the economical employment of original design for the decoration of comparatively limited spaces. This might, of course, lead to terrible results; yet it was amusing and interesting to look forward to a time when people would no more think of buying ready-made decoration for their rooms than ready-made clothes for their bodies. True, clothes made to order did not always fit, and probably the new stencilling, if it ever became popular, would reveal many eccentric failures; yet anything which tended to impress the personal taste of the inmate on his surroundings was, in itself, evidence of vitality—if not necessarily of art.

Mr. Alexander Rottmann said that stencilling had been spoken of as a substitute for hand-painted decoration, and this was a great point, for it was a question of the difference in value as a decorative factor of the stencil, and how it compared with the hand-painted decoration. He should say that it would make a lot of difference in the way of decorative work as applied to buildings, and that in future it would considerably reduce the cost of the hand-painted work. It was natural that where design was based on so many compartments, surrounded by frames, and the whole formed one entire decoration, it should naturally show much more character, strength, and individuality than a hand-painted decoration which had nothing to rely upon, or had only the so-called "holds" to depend on. The name of Japan had been mentioned in connection with stencilling work, and he had taken a great interest in that country, having lived there for several years. Some thirteen or fourteen years ago he travelled right across the country, making himself acquainted with the various art productions, and he then came across a very interesting industry, viz., that of cloisonné. Up to fifteen or twenty years ago the cloisonné work of Japan had been based more or less on the Japanese system of working, and was principally done in opaque colouring, on a rough or porcelain surface. Some men, however, had devoted themselves to an entirely new process, in the way of covering copper surfaces with ties, and introducing graduated effects such as applied to the principal part of Mr. Silver's decorative stencils. Another question which arose was how was it that the stencil had all at once come to the front lately, and he could say that, as the machine had made such tremendous strides in progress, it was quite impossible, unless one was an expert, to sometimes tell a hand-painted block-paper from a machine-printed one, for although used to these productions, he sometimes found it difficult to tell the difference between the two. There should be, however, a difference between the hand production and the machine production, which should be seen at once by people who were not even experts in the matter. It was but natural, therefore, that something new should crop up, which should take the place of these hand-block papers, and he considered that was where stencilling had its chance. After all, the block-printed paper must always produce, more or less, the same effect, whilst, if working the stencil, it often happened that the second or third repeat necessitated making certain shadows lighter or darker in order to meet the exigencies of the case. In the case of a room, it was only natural that those parts which came near the light should be expressed in darker tones than those which came near the dark part. Now, was that possible in block printing?

Mr. Day: Yes, you can plan your colours; it is continually done. You can produce a similar effect if you take the trouble and expense.

Mr. Rottmann said that Mr. Day had mentioned that stencil work should be applied to the wall direct, but he could not see that.

Mr. Day: I only mentioned that as a personal prejudice.

Mr. G. H. Fellowes Prynne said Art has, indeed, many sides. When he saw the title of the paper, "Modern Stencil," he little thought that the subject could be raised to such an art level as had been attempted by Mr. Silver. Modern stencilling really made one think of mechanical stiffness, and until this evening he did not believe any of the members present knew sufficient of modern stencilling, as produced at the present time, to realise what effect could be given by it. He was not going to back up stencilling entirely, but it seemed to him to have very great uses, and to give possibilities that had not occurred to architects before. Mr. Day had referred to getting different coloured effects in certain parts of the room by the use of paper, but the expense of doing so would be simply enormous (Mr. Day, "certainly"). Then why not have hand-painting at once? On the other hand, with the stencil, effects could be obtained in different parts and different lights, and gradations of colour could be got at very moderate cost. The possibilities of the use of stencilling in ecclesiastical work were very great, and were not ignored by the Mediæval architects in any way. With regard to some of the examples on the wall he objected to calling a thing a Holbein, which had no idea of Holbein about it; it was far better to say that it was a simple design in stencilling work, and allow it to speak for itself. There were beauties and possibilities about the work, and in certain cases its uses might be most capable of being utilised. He heartily welcomed such practical papers and demonstrations as they had had that evening.

Mr. H. W. Pratt, like the last speaker, had come down to learn, with some vague ideas as to the modern development of stencilling. One had been brought to look upon stencilling with a considerable amount of prejudice, which he supposed arose from the fact of only having seen it done with zinc plates and body colour in a mechanical way, which was a totally different thing to the beautiful artistic effects produced by Mr. Silver. Such work must require a man with brains in order to carry out its beautiful effects, and he thought that the number of patterns and the repeats, added to the brains, must bring out rather expensive results, although it was not expensive as compared with absolute handwork. From the architects' point of view it appeared to be a thoroughly legitimate and conventional architectural method of decoration. It showed on the face of it what it was, and on that account must certainly commend itself to the architect. He could not help saying "Amen" to what Mr. Lewis Day had remarked with regard to the English sense of colour. One was struck with the fact that the colour seen in France, Germany, and Italy was different from ours. No doubt their idea of decoration was so different that they could not bring themselves to adopt the same treatment of colour which seemed to be in vogue here. Mr. Silver had told them that it would be impossible to get these beautiful effects and gradations of colour if applied to

plaster, and if that was so it was certainly disappointing, showing that they had not gone very far ahead to be obliged to make use of fabrics, and to hang these on the wall.

Mr. Matthew Webb remarked that he knew of one instance in London in which the stencilling was done directly on the wall. He could see no reason whatever why the same colours could not be used with stencils on the walls that had been used for *tempora* painting. That would be an interesting experiment.

Mr. H. A. Satchell wished to know the amount of time and expense involved, comparing stencilling with handwork.

The President said that Mr. Silver had shown them examples of work stated to have been done in years gone by, but there was a great deal of that sort of work done nowadays. If that were compared with what was shown on the walls, they must all feel that the value of stencilling depended entirely on the workman, and that led one to say that stencilling was in itself absolute handwork in every sense of the word. It was true there was a mechanical process used to get at the result, just as masonry was tooled, but the very mechanical process, viz., the use of the ties, led to a distinct artistic result. Mr. Silver had impressed them with his own mastery of the subject by the way in which he was able to expound it, both practically and theoretically. The essence of the result lay in the fact of these graduated washes, but there was a stumbling-block in these to be guarded against, in that they were apt to take the design away from the flat treatment, and when they led to such a treatment as was shown on the somewhat alarming scroll design on the wall, he considered it was going rather too far. He believed no one could live happily in a room where a design so shaded formed the frieze. There was thus the danger of carrying the method beyond its proper limitations, and he felt sure that the introduction of figures in some of the designs was open to grave question. Mr. Silver had given them some very interesting remarks about the value of English design, which they must all feel grateful for. There was one quality of latter-day English design that had certainly been distinctive. He did not know who originally dug it up, but there was something in the shape of a squirming tree, which some of the best designers had all used at some period or another. He was rather inclined to think that that tree had been worked a little bit too much, and he hoped that English designers would progress beyond it. With regard to the interesting controversy between Mr. Rottmann and Mr. Day, he was a little fearful of treading on rather delicate ground, but he believed that Mr. Rottmann was correct on the point he intended to bring out, viz., that, with this method of stencilling, they could do what could not be done with block printing. By the use of stencilling, without any extra expense varied effects could be produced in the same room, made to balance with the lighting of various parts. A great deal had been said about French and German colour, and very little about Japanese colour. Ought they not to claim for English colour the pre-eminence, when the English had gone to the Japanese for their ideas?

The vote of thanks was then put, and carried unanimously.

Mr. Gleeson White shortly replied for Mr. Silver, who was suffering from deafness, and the proceedings terminated.

THE MODERN STENCIL AND ITS APPLICATION TO INTERIOR DECORATION.

THE following is the first part of a paper read by Mr. Arthur Silver at the last meeting of the Architectural Association, as elsewhere announced:—

When your Secretary was good enough to ask me to read a paper before this Association upon the subject of Interior Decoration, I felt that, complimentary as it was to have so great a theme suggested, it was too big for me to tackle.

It is true that I have been actively—most actively—employed in design as applied to many materials, and the opportunities that I have had in the past for carrying out complete schemes of decoration, though not few, were so hampered by Philistine prejudices that I turned my attention more exclusively than ever to designing, and only availed myself of the rarer opportunities which occurred for unfettered treatments.

The capacity for working out one's theories is one thing, and the power to explain them, while they only exist as schemes, is another; also, owing to a slight defect of hearing, I have lost much of the knowledge one derives from hearing the ideas and criticisms of others.

Therefore, in this paper I have limited my attempt to a very small corner of the wide field of interior decoration, and done even that in a way that fails to satisfy myself, so I must ask the indulgence always bestowed upon a 'prentice effort.

At the moment of accepting your Secretary's invitation ideas crowded thick and fast within me. It seemed an easy thing to write a paper, as easy as designing, or shall we say—stencilling.

One had but to plan out the stencil-pattern in approved lecture form, and colour it with pigment of one's own choice.

But face to face with pen and ink it was different, and the knowledge that what had to be said was not the spontaneous chatter of a craftsman who rarely finds lack of words or ideas when discussing his particular shop with fellow workers, but a more or less formal argument which, before being spoken, must be reduced to the unemotional written page. This fact put all ideas to flight.

One naturally desires, in the space of a brief paper, to find that pearl of great price, a perfectly happy idea, as the text of a discourse, so I should like to build up before you the scheme for a magnificently regal structure, worthy of your attention. One which should embody the architectural genius of the past, the present, and the future. A three-story building rising from the dull prosaic earth, through the presence chambers of art to the clouds of fancy.

In this lovely pleasure house of spacious halls, with corridors leading to sumptuous boudoirs and banquet rooms; with marvellous galleries, and the great staircase a veritable golden ladder, upon which the winged inspiration from above should meet the sober creations of utilitarian requirements, passing and repassing in harmonious accord—in this building the key-note should be jewels and precious metals, outvying Aladdin's palace in splendour.

But the dream of such ideas vanished even before I tried to put it into practical form; yet the first inspiration held perhaps some new ideas to be touched upon later.

For jewels and gold one substitutes gessos, and metallic lacquers may replace the ivory, stained glass and mother-of-pearl, which contented imagination employs so lavishly.

Still beauty—which is democratic—may be found abiding no less in the modest home that is within reach, than in Spanish castles which belong to dreamland.

This, as I said, was the mental pigment which came to colour the stencilled formal outline of a prepared idea.

The very word *stencilling* comes as an anti-climax to the ambitious schemes I had mapped out. For it appears feeble enough to put this old-fashioned and simple method as a novelty after all the ingenious mechanism and wealth of decorative materials of the nineteenth century. Stencilling as a factor in serious art, seems hardly more noble than the Berlin wool work of our grandmothers.

Yet if one breathes the word Japan in this context, the hideous patterns of the jerry builder are forgotten, and we recall a system of decoration that ranges from the most simple to the most elaborate effects, and does so without tasking the capacity of the average workman.

Not for a single moment must we lose sight of the fact that the stencil-plate is a mere implement, but that the brush of the worker is aided by brain-power, unconsciously exercised possibly, but with results such as you may see; there you have a factor which tapestry, printed fabric, mosaic, and dozens of other more or less costly alternatives can never offer.

For stencilling is in its essence the work of the hand, guided and assisted by artificial help; yet always directly under the control of the worker. Hence the variety of colour, which the Japanese teach us is the most vital quality of stencilling, places stencil at the very head of all semi-mechanical methods.

The old and erroneous idea was that hand-work, especially in repeated ornament, should try to achieve the dull accuracy of the machine, so in the old stencil, flat equal colour was a *sine quâ non;* the newer and better idea is surely to impart to mechanical work all possible accident of individual expression.

In the stencil-plate you have a method of repeating *form*, which if you wish it can be repeated with a regularity as precise as in printing or weaving. But while the printing block, the engraved roller, or the spool of yarn, can never vary its pre-arranged colour, stencilling is capable of immense variety. Here the great difference is seen, and the possibilities of stencilling open out.

My own experience may be worth mentioning, but I beg to be absolved from any egoism in the matter. Mr. Aldham Heaton, Mr. Graham Rice, Mr. Ingram Taylor, Mr. Francis Heron, Mr. Gwatkin, and other designers, professional and amateur, have each in their own way, done very charming things. I do not put my ideas before you as the only methods, nor claim that they are most novel or the best that can be done; I am anxious to learn, and I trust to-night to be enriched by the experience of others. Each worker must be influenced by his predecessors, yet if his art and heart are in the attempts, fresh, and probably interesting, modifications result. For instance, I may claim to have adhered to the legitimate principle of stencilling, and to have developed it as a distinct factor in the pattern. I have tried to make the construction decorative, as well as to decorate the construction.

Practically speaking, a stencil is a cut-out pattern which may be reproduced *ad infinitum* by the application of colour brushed over its surface.

Syllabus.—To deal in methodical order with practical details, I will refer to the necessary *construction* of the design, the method of cutting, the materials useful for that purpose, the vehicles for preserving the stencil, the method of securing accuracy in the superposition of the plates which is called "registering," the process of colouring, and the different vehicles useful. I will then refer to the fabrics which are effective for our purpose, and discuss their different virtues and qualities, and then conclude with reference to the ethical phase of design, the scope of colouring, and a general view of possibilities.

Planning.—We have assumed that the design is planned. I find the best way is to sketch the idea roughly in charcoal, then tint it broadly in colours to correspond to the separate plates required, and finally with a brush of pure white pigment correct the contours of your drawing, and put in the "ties."

Ties.—These said "ties" are the spirit and essence of the stencil, and so far from being considered a galling restriction on your fancy, they must be considered, as they are—most helpful. As I shall explain elsewhere, it is by no means essential that they are all, or even any, left in the ground colour of your fabric. Again, you may quite disabuse your minds of the old idea that ties must be of the same strength and thickness. That is one of the blunders of the past.

The strength of the ties must be in accordance with the area they have to support, and should vary according to the amount of accentuation or expression to be insisted upon. You can realise at once the absurdity of uniform outline if you endeavoured to treat the fine inner petals of, say, the double poppy, to the same strength of "tie" as would be required to emphasise the broader and outer ones. Of course there is the limit here as in all else, and your limitation is governed by the area cut and uncut which your ties have to support. Again, in dealing with your ties, you must always arrange that they are connected with each other or their boundary, which is only another form of "tie," otherwise you have a loose and flabby implement. Again, let me repeat, do not be frightened by the ties, but regard them as possessing most important values. They are a constant restraint, which prevent you from lapsing into too realistic details.

As I said before, it is not necessary that the ties should show up in the ground colour of your fabric. By the use of a mask you may tint any portion of the surface of your fabric to suit the colours which will be laid upon it ultimately. Thus the ties may occupy their position in relative colour which corresponds to their relative plane. So even ties may show a graduated effect of colour.

Having now planned the design, the next step is to trace it carefully and transfer it to the material in which you select to cut it. The method of cutting I shall refer to later.

If you employ paper for your plate, after the pattern is cut, it should be coated with a preservative such as knotting or turps combined with knotting, or some other vehicle such as gold size and boiled oil. These possess the quality of rendering it waterproof and toughening it.

Let us assume that we have a design requiring two plates to carry it out, and that these plates are large, say 6 ft. by 3 ft., and that one, the background of the design, is of small foliage where the ties naturally only enclose small areas. The other plate has bold and more important features with larger areas cut out. This latter plate will contract, or buckle, thus interfering to some extent with the exact registering of the

design. You cannot help this, so you must manipulate all the more carefully.

Japanese Stencils.—The Japanese have a way out of this difficulty. They cut many stencils at a time. Each plate is composed of two sheets, the upper and the lower, but between them they insert silk threads for the purpose of serving as ties, and to strengthen the plate generally. I have brought some for you to see. You will be able to observe that these threads are practically not existent, because the action of the brush moves the threads aside, and, therefore, the colour gets underneath. Although I am not prepared to accept this principle of construction in its entirety for the modern requirements of English decoration, in which very much larger dimensions are necessary, I still think that for occasional purposes they might be used. Such, for instance, when an unbroken outline to a circle is required, like the letter O, which might be quite well cut in an unbroken ellipse and the central mask supported by threads.

Material.—As for the material for the stencil plates, I have not yet discovered the ideally perfect substance; at present the best appears to me to be the stoutest cartoon-paper procurable, but it has its defects. The ideally perfect material should be easy to cut so that it opposes no obstacle to the full expression of feeling of the design—that is to say its drawing. At the same time whether cut in small or large area the plate itself should lie flat by its own weight.

The most promising fabric I have seen for this purpose is one prepared at Mr. Alexander Rottmann's factory in Tokio; it is extremely tough, made probably of waste silk; it appears afterwards to have been soaked in fish oil; I have great hopes of this material. Both cartoon-paper and this fabric of Mr. Rottmann's may be cut on glass with the ordinary penknife. As to the durability of cartoon-paper, much depends upon the worker. An impulsive stenciller will break in fine frenzy the ties in a very few repeats, or even by merely handling the plate. On the other hand, a careful worker can execute a hundred yards and the stencil will not be depreciated.

I have occasionally experimented with sheet-zinc, but with this you lose all "quality" in the design. The subtlety is gone, and a hard mechanism of a metal outline replaces the flexible expression of the brush or pencil. The method of cutting zinc and other thin metal is that first you go over the outline by means of a graver, then a hole is punched near the boundary of the form; the broken edge is then nipped firmly by the pliers, and the mass is torn away, the tear taking the direction of the graved lines, after this, edges must be filed. Small work with very fine detail (such as the Christmas card I am exhibiting) is best executed on very thin sheet-copper or brass. This must be coated with a resist, the design traced with a sharp metal point, and then the plate is subjected to an acid bath. The acid bites through the unprotected lines, the detached pieces fall away, and the result is as I have shown it to you. This method is not practicable for large designs requiring thicker sheets of metal, because by the time the acid has bitten *through* the plate it has also bitten sideways and destroyed your ties, if not your drawing. Besides, you can hardly control an acid bath 6 ft. by 3 ft.

Next, as to the actual stencilling. For a single plate you can do pretty much as you please. You can work one equal colour over the whole surface, or a dozen. But if the plate is a unit of a repeated design, the question of registering becomes of paramount importance. Indeed, this obstacle has probably prevented stencilling being exploited for many years past. For this repeat is not only a question of the same forms reappearing at equal intervals; but, also of joining the edges of the separate units correctly so that any subtleties of line or form may be accurately united.

To accomplish this, a terminal portion of each succeeding stencil is cut out in the preceding one. These terminals, or, as we call them "keys," are lightly painted in with the first stencil-plate, the succeeding plate has to reveal these "keys," and when it is accurately fitted, it is a proof that you may proceed with safety. In wall papers, opaque colours minimise this difficulty of fitting the pattern. Any portion of one shade will match the similar shade in another piece; but for stencilling with its individual broken colour the shades are only approximate, and a straight joint would make the difference very evident, and to this difficulty I will refer later.

Fabrics.—Now let us consider the fabrics suited for stencil decoration. You *can* stencil anything, from a cork carpet to tissue-paper, from the finest woven silk to the coarsest sacking, from a sheet of glass to rough casting used for exterior work; but the pigments must be adapted to the material. These vary from water-colour to encaustic (that is, melted wax), from soft pastel to stiff distemper, or oils.

The fabrics I have tried are legion; and it would serve no purpose to read you a list. All the examples shown are worked in stains or dyes. Consequently they are all washable, and, as far as my experience has gone, quite permanent. Here, again, in fairness to myself and my coadjutor, I am not prepared to give in detail the final result of elaborate and costly experiments. I have altogether discarded distemper for woven fabrics, although this does not prohibit its use for paper. Distemper and cloth are foreign bodies which do not amalgamate. Neither do I like opaque colour in oils where the decoration is near the eye or liable to be rubbed, *unless* the colour is thoroughly beaten into the cloth. Water-colour and distemper have both of them fine qualities, but for work which is to be thoroughly useful I give the precedence to oils and stains. For in these latter, graduated washes come naturally. Now, I think we shall agree that the chief artistic value of stencil lies in its graduated washes of colour, therefore I will say no more of opaque colours, for it is quite clear that they are not more difficut to work, and can be substituted if required.

I do not of course say they are incapable of artistic treatment, but with them you approach the mechanical effect already obtained in wall-papers and the like.*

THE CONDITIONS OF BUILDING CONTRACTS.†

The next point to which I would desire to refer are the difficulties which arise where there are two clauses in the same contract covering the same matter. I have no doubt that such clauses will have frequently come under the notice of members present. In the first case, there is often a clause, or sometimes one or two clauses, making the architect's certificate final; and in addition to these clauses there is often a general clause submitting all disputes to arbitration. The question, then, is how two such inconsistent clauses can be reconciled, and the Court of Appeal has held that the arbitration clause is to be considered as a proviso to the certificate clause—that is to say, that if disputes arise before the architect has certified or decided the matters in which his decision is final, the arbitration clause comes into force, and the architect has then no jurisdiction to certify at all as to those matters; but, on the other hand, if the architect has certified or decided before disputes have arisen, then his decision is final, and the arbitration clause in respect of those matters never comes into force at all. In such matters it was agreed in the Court of Appeal that the certificate clause was a clause to prevent disputes from arising, and therefore, as regards the matters included within the powers of the architect, no dispute could arise whether he had certified or whether he had not, and therefore there never could be a matter to go before the arbitrator. But the Court of Appeal said: "If the certificate clause is a dispute-prevention clause, then, if it does not prevent disputes from arising, the arbitration clause comes into force." From this it would follow that if the architect has certified that certain moneys are due, or certain measurements are correct, and no disputes have arisen before that has happened, he has succeeded in doing what that clause provides, and has prevented disputes from arising. But if disputes arise before the certificate is given, then the whole of the jurisdiction of the architect is ousted.

The case I have been referring to is one I reported myself (Lloyd *v.* Milward, page 454 "Hudson on Building Contracts"), and it arose upon the construction of Clause 18 and 20 of the Conditions of the Royal Institute of British Architects I have before referred to. The importance of this decision cannot be underrated, and what its consequences may be I cannot entirely foresee, but it is quite clear that a very awkward state of affairs may exist. Supposing, for instance, the simplest case, that an architect condemned materials, ordered their removal, and the builder raised disputes. It seems to me there would be a complete deadlock. The architect's powers of causing the materials to be removed would have ceased, and the arbitrator would have to be called in at once, otherwise there would be nothing to stop the builder going on using the condemned materials; and so all through the contract the builder might at each step dispute the architect's decision and destroy his power entirely, substituting the powers of the arbitrator. Of course, the builder would run very great risks in such a course, but it is quite conceivable that there are many such cases where the employer would be very much injured. But there is no reason whatever why the arbitrator should not be called in at any time and from time to time to see the work in dispute, and it is far better that he should. He might give his decision when necessary immediately and without formal evidence, if his powers were sufficiently wide, while he could allow other matters to stand over in his discretion. No one, however, would venture to stipulate that a builder's rights to go to arbitration should be deferred till completion, because by such a condition he might be compelled to do work for an impecunious employer and defer his claim until completion, but no doubt there are certain matters the settlement of which should properly be left till after the completion of the works. The only way to avoid the consequences of the decision in Lloyd *v.* Milward is to clearly exclude from the arbitration clause matters which are not to be the subject of arbitration.

I am afraid my paper is very short, but I was afraid to go too widely into a subject of this kind, because I should open so many subjects for discussion. There are such an innumerable number of clauses in building contracts that I was afraid to touch upon all of them; but it is a subject on which I could go on for a very long time if I did not tire you. There are many clauses in the conditions of building contracts which are really the subject of the specification, and they only get inserted in the general conditions because they occur in nearly every contract. These clauses would be more appropriately termed preliminary clauses of the specification. Take, for instance, the clauses that the contractor shall provide all plant, tackle, &c., and water for the works, and again that he shall take all risks. It is sometimes said that clauses of this kind, providing that the builder shall take all kinds of risks and responsibilities, constitute a hardship, and that such clauses are unfair, but it seems to me that this is quite erroneous. All risks are a matter of insurance for which a prudent employer may properly provide against and for which the builder should put a price in his estimate, and if he does not do so it must be that he takes the risk without desiring to make any charge. No one expects him, however, to do so any more than one would expect Lloyd's to insure a ship or a fire office to insure a house for nothing.

But there does seem this question, which may give rise, and has given rise, to considerable unfairness to a builder, upon clauses which provide that a builder shall complete the contract, whatever it may be. Those clauses hitherto have been little understood. It has always been supposed that the architect warranted that the building could be carried out according to the designs which he prepared, and the builder always thought that he had only to say that the particular design could not be carried out to require and demand that the architect should make an alteration or give an order for an extra. But in that builders have been entirely mistaken. The question first, I think, arose in the case of Thorne *v.* The Mayor of London. In that case the builder contracted to construct a bridge, and in trying to construct this bridge he did everything which was provided in the specification. The difficulty arose in the construction of certain caissons in a particular manner, and, after spending an enormous amount of money, he failed to carry out the work in the manner specified, but completed his work in a different manner. He then claimed to be paid extra for all his work, but the court said, "Not at all; you had to do the whole work, and unless you did it you would have been liable for damages for not doing it."

The next case, which occurred in a similar way was Sharpe *v.* St. Paul's Railway Company. There the contractor agreed to make a railway between two points. He found that the designs as prepared by the engineer were impracticable, and he went to the engineer and asked in all simplicity would he mind altering those designs. The engineer said "Certainly not." I think he also went to the length of saying something extra would be given for the work. But at any rate the

* The remainder of Mr. Silver's paper will be given next week.

† The conclusion of a Paper read before the last meeting of the Surveyors' Institution by Mr. A. A. Hudson, the first half of which we printed last week, page 161.

engineer altered the designs, and the railway then took a totally different course. The contractor at the end of the work claimed a large excess for having made this enormous deviation from the contract, which was, in fact, scarcely the same contract at all. The Court of Appeal said, "You are not entitled to anything; this was a concession, you had to perform this contract, and if you did not do it as you had contracted to do you would have had to pay damages. Therefore this was a great concession to you, and as regards the engineer telling you he would pay you extra, he had no authority to promise you extra payment for a thing which you had bound yourself to do at the price named in the contract."

The last case of the same kind was Bottams *v.* The Corporation of York. That was, I think, a more flagrant instance than any of the others. The builder had never ascertained the nature of the subsoil, which turned out to be a nasty spongy kind of clay, in which he had to construct, I think, brick sewers. The engineer had designed these sewers in a way which would not stand for that particular soil. The builder constructed the sewer and it was crushed in. The engineer quietly sat still and demanded that it should be reconstructed, which the contractor did, again unsuccessfully. That operation was repeated several times, and at length the contractor got rather tired of making futile attempts to do what was impossible, and, having probably spent all his money, came to the Court of Appeal and said, "I want to be paid." The Court of Appeal said, "The Corporation of York have not behaved well. We are sorry we cannot give you relief, but you are not entitled to any payment at all." In that case again the builder failed. So that the builder may perhaps suffer hardship in this sense: he has generally supposed that the architect warrants that his plans can be carried out, whereas the truth is that the contractor warrants that he can carry out the architect's plans, and if he does not carry them out, and if the architect's plans are not feasible or not practicable, the contractor is liable, and not the architect or employer.

Another important question which I think must have been exercising the minds of architects of late is whether there should be a term in a building contract by which the architect or engineer should certify the completion of the work. I say that because I notice the certificate clause has been left out of the new conditions of the Royal Institute of British Architects. I am sure the reason for questioning the advisability of inserting this most common condition was a recent case of Rogers *v.* James. That case decided that an architect is liable for negligence to his employer notwithstanding the fact that he is, by the terms of the contract between the builder and the building owner, in a judicial or quasi-judicial position.

Until that case was decided it was commonly supposed that an architect under a building contract in which his decision was final was arbitrator of his own negligence, and therefore he was able to do what he pleased, act in whatever way he pleased, order what he pleased, and then certify what he pleased, and be excused for every negligence which he had committed during the progress of the work, and not be liable to the employer or anyone else; but the case of Rogers *v.* James disposed of that very finally. The decision was of course, as all decisions are, a decision as to what the law was before, only there was no case, curiously enough, which decided that it was the law. But a case which brings home to people their exact legal position in a strong light is apt to make them think. And the architects quite reasonably must have been thinking why they should whitewash the builder by their final certificate from all liability for defects and bad work, when the architects themselves might be held liable to their employer for not discovering the builder's defects or bad work. The result apparently is that the Royal Institute of British Architects have in the new set of conditions omitted the final certificate clause, but there was nearly always in conditions a provision requiring defects to be made good during a limited period. The object, no doubt, of the omission of any certificate at all is to render the builder liable until all liability of the architect is barred by statute of limitations, but the mere omission of a final certificate will not carry out this object.

The other provisions of the contract must be looked at to see how far the builder is liable, and the questions I have already discussed as to work being done to the satisfaction of the architect might conclude the liability of the builder in respect of the work as to which the architect had expressed satisfaction; and, further, a condition that the builder is to rectify all defects appearing within —— months, provided they are defects in the opinion of the architect, would be inconsistent with an implied term that he was to be liable for some longer period. For these reasons it may be thought desirable to avoid contracts which make the architect's decision final as to satisfaction. Because in so far as the architect's decision is final as to the work being done, the builder is released from all liability directly the architect's certificate or approval is given; therefore from the point of view of a builder who desires to do good work, and who may by some accident have defects arise in the work, that builder is in a better position if he get the architect's certificate of satisfaction than if he is to be left liable, possibly for six years for any contingency which may arise, either by weather or by all kinds of things which it may be difficult to foresee and more difficult to dispense, but as to which large questions may arise which may lay the builder open to heavy claims for damages.

The only two other clauses which may be considered of primary importance in a building contract are the clause relating to the time for completion and penalties and the clause as to deviations from the contract, but I do not think it would be desirable to lengthen this paper by their discussion. I would only add this, that penalty clauses are frequently said to be unfair to a builder, but from my experience they are generally an advantage to him, because if the parties did not define beforehand what the builder was to pay in case of failure to complete to time, he would in many cases be liable to much heavier damages. Cases occur over and over again when a small penalty per week being fixed which limits the amount which the employer can recover from the builder, the employer finds that by a few weeks' delay he has lost the season for letting his house, involving the loss of a whole year's rent, or in other cases has to incur expense and loss far in excess of the penalties to which he is limited. Whatever the conditions of building contracts may be, they are useless unless the architect and builder observe them, and regulate their relations to each other accordingly. Take, for instance, a case where an employer has agreed to let a house by a particular date, and he fixes a penalty of so much a week, perhaps £5, to be paid by the builder for non-completion to the time. He does not make, as he ought to make, some allowance so as to give a margin between the date when he requires possession of the building and the date when the building completes. The result is, perhaps, that he loses the letting of a house for a whole year; and the builder, in the same way, is liable for all these damages which he would have suffered had it been left without a penalty clause at all in the contract, and had been merely left to the question of common law liability as to the amount which the builder is liable for with the knowledge he had of the requirements to which the employer was going to put the building.

Then another matter should be carefully considered with regard to building contracts, as disputes constantly arise in regard to it. A contract may be prepared as well as anyone can prepare it; but architects appear to think—and I say so with great deference—that they have only to carry out the practice which they learnt as pupils, whatever the contract may be and whatever the altered conditions of the particular contract in hand. It sometimes happens that a contract is prepared by the solicitor for a public body, or it may be by a solicitor for a private individual, and certain clauses are put in as to penalties, as to the ordering of extras, and as to those various provisions which occur in every building contract, and immediately this contract is started the builder, the architect, and everyone concerned disregard the contract altogether. Then at the end of the work comes the question, What is to be done to settle all these disputes? whereas they might have had a perfectly consistent contract—a contract which could have been executed without the slightest hitch or the slightest bother. But the whole contract is ignored. Then it becomes a question whether the clauses of the contract are applicable at all to the circumstances which have arisen since the contract was entered into.

Very interesting questions sometimes arise with regard to contracts with corporations under the Public Health Act. Certain provisions in that Act have to be complied with. In the first case a contract must be made under seal; in the second case there must be a previous estimate by the engineer, or by the surveyor, as the case may be, of the ultimate cost of the work, and further, the price must be fixed beforehand. Now one of the most common clauses in a building contract is that the surveyor or engineer shall value deviations from the contract. In so far as that clause provides that these deviations shall be valued upon a schedule of prices I think there is no doubt the contract is good within the Public Health Act, that is to say that the builder can recover payment for what he has done. But in other cases, where there is no provision and no schedule of prices on which the work is to be valued, the builder has not complied with that section of the Public Health Act. Therefore I think it is good law that where there is merely a valuation clause in a contract the architect has power to vary the contract, but the builder cannot recover because no price was ever fixed in the original contract entered into by that contractor when he was employed by the corporation. These questions as to contracts with corporations are of the utmost importance to builders, because, as happens so frequently, all kinds of alterations are made, and unless there is some provision by which a definite price is fixed for each particular part of the work, there is no possibility of the builder recovering, unless the contract is for a sum less than the limit under the Public Health Act.

There is another point which I think is very difficult to settle. Everyone present will know the difficulty of providing a builder with details immediately the contract is signed. If the builder is at all an ingenious individual, he starts at once by asking for every detail in the whole building. This he keeps up and makes the foundations of a very good lawsuit by the time he has finished, provided the architect does not know what he is doing and takes no notice of any of these complaints. First of all he asks for the joiners' work, and the reply is that it will be done as soon as possible. The next thing he says is that he is very much hindered and delayed because all his joiners are standing idle. He wants work for them and he wants to get the work seasoned. And he employs the same tactics from beginning to end. I think it is an extremely difficult thing to know how this is to be provided against, because the builder is entitled, as soon as he has signed a contract, to have every detail for the whole of the building. There is no reason why he should not, but it is a great tax upon an architect who has been busy getting tenders to be called upon to settle an enormous number of details in order to allow the builder to proceed. That is one of the provisions which should certainly have more care paid to it, for otherwise the most skilful and most diligent architect is sure to have a law-suit brought against his employer, because he has not supplied details when he ought to have supplied them; and he again will be hauled over the coals if he is not actually subjected to an action for damages by his employer because he has not supplied details which he impliedly contracted with his employer that he would supply, and in the proper time.

Another cause of dispute frequently arises where an employer supplies materials himself. Directly an employer agrees to supply anything for a builder the work is sure to be behindhand; the builder is sure to be waiting for the materials. I remember a case in which the builder constantly put "waiting for iron work" in his diary. He did it all through the work, and it was perfectly true that he was waiting for the iron work; but only for a day at a time, but still every time he got ready for the iron work he wrote in the diary, "waiting for iron work." When I had this enormously long diary to deal with, with "waiting for iron work" all through, I found it almost impossible to explain before an arbitrator why he was always waiting for iron work. The employer supplied it, and so the builder was always "waiting for it." Upon that point arises an important question which I had almost forgotten, and that is this question of the employment of special contractors. That seems to me to be at the root of almost every dispute on building contracts in London. The architect agrees that special contractors shall supply work; he gives the builder no control over this work, and the builder has all these special contractors running about his work, using his plant and materials, and interfering with his men. Now, I think, there is a way out of that difficulty if architects would only adopt it. Give the builder more latitude as to the choice of these special contractors. Architects probably do not realise how these special contractors, directly they get employment direct

from the employer, and know they are going to be paid by him, immediately set to work and do anything they can to cause annoyance to the builder. The builder is harassed from beginning to end of the contract, and the employer has often a heavy action for damages to answer for when it comes to the end. In those cases I think the architect might very well allow the contractor to contract with these special contractors himself. The contractor ought to be allowed to make terms as to when and how the work is to be supplied, so that he might get his contract done within the time. But what generally happens is this. The builder knows nothing about the contract with these special contractors, and all he has to do is to go through the form of having a certificate made in his favour for a certain amount which he has to hand over to these special contractors—the special contractor often telling him that he will not supply anything at all unless this money is handed over, another cause of delay to the builder which it is impossible to avoid.

One other matter I would like to refer to is the question of penalties and extension of time. In most contracts there is a power in the architect to extend the time in the case of delay, and what the architect generally does is to take no notice of that clause at all and never extend the time. The result is that, where the employer had a very good excuse for delaying the work, because the architect could extend the time and therefore release him from any liability; if he does not extend the time at all it makes the employer commit a breach of contract, because the builder must complete within the time, and if the time has never been extended, and the architect has ordered extras and the employer has permitted delays, it is quite clear that the builder never could complete within the original time. Therefore the employer has broken the contract.

THE LONDON COUNTY COUNCIL.

THE usual weekly meeting of the London County Council was held on Tuesday in the County Hall, Spring-gardens, Sir Arthur Arnold, Chairman, presiding.

Technical Education.—On the recommendation of the Finance Committee it was agreed, after discussion, that 120,000*l.* should be appropriated by the Council for the purposes of technical education.

Loans.—On the recommendation of the same Committee it was agreed to lend the Poplar District Board 2,000*l.* for sewer works in Orchard-street and place, Isle of Dogs; the Limehouse District Board, 8,400*l.* for paving works; the Deptford Baths Commissioners 15,000*l.* to defray the cost of erecting baths and washhouses at New Cross; and the Newington Baths Commissioners 15,000*l.* for a similar purpose.

Thames Steamboat Service.—The report of the Rivers Committee on the question of the steamboat service on the River Thames was discussed. The Committee have come to the conclusion that the first step towards providing London with an efficient steamboat service and restoring the Thames to its old service as a highway, is to free the piers from toll and to provide improved landing stages with better approaches. With that object, they have instructed the engineer to advise them as to the existing piers and the formation of new piers, and the best mode of forming the necessary approaches. With regard to the Council providing a steamboat service, they thought that this question should be deferred until it has been ascertained whether private enterprise is prepared to meet the requirements of the passenger traffic of the river.

The report was adopted after a hostile amendment had been defeated.

The Water Question.—The Water Committee brought up their long report, the consideration of which has been postponed for several weeks, in which they gave full particulars of their scheme for drawing 415,000,000 gallons of water per day from Wales at a total estimated cost of 38,772,250*l.* They proposed that in the first place the Council should deal with one section of the scheme. The specific recommendations of the Committee were as follows:—

(*a*) That the Council do approve the following conclusions:—

(1) That it is in the interest of London that the requisite augmentation to its supplies of water should be derived from some source other than the Rivers Thames and Lea.

(2) That the valleys of the Usk, the Wye, and the Towy with their contributaries furnished the most suitable area from whence such supplies should be derived.

(3) That the Usk and Llangorse section of the Welsh scheme, as set out in the above report, should be undertaken in the first instance.

(*b*) That the Water Committee be instructed to continue the surveys of the whole of the Welsh scheme, and to prepare such plans, &c., as are necessary to enable the Council to apply to Parliament in the session of 1897 for powers to carry out the Usk and Llangorse section of the scheme, together with the requisite conduit to London, and for powers to purchase such sites for reservoirs and such other rights as may be necessary, in order to ensure that the other areas referred to shall remain available for the supply of the metropolis.

(*c*) That, subject to an estimate being submitted to the Council by the Finance Committee as required by the statute, we be authorised to expend a sum of 10,000*l.* in relation to the above matter.

On the motion that the report be received, Mr. Westacott moved that its consideration be deferred for three weeks, urging that a delay was desirable in order that the Council might, before proceeding in the matter, ascertain what were the intentions of the Government. The motion was seconded by Major Probyn and negatived.

The Earl of Onslow then moved the following amendment:—

"That it is in the interests of London that provision should be made for augmenting the supplies of water to meet the needs which may ultimately be felt, by securing some source in addition to the Thames and Lea; that the valleys of the Usk, the Wye, and the Towy, with their tributaries, furnish a suitable area from some part of which such supplies might be derived; but that inasmuch as Her Majesty's Government has given notice of legislation on the question of the London water supply it is inexpedient to incur further expenditure until the views of the Government be known. That the Committee do therefore report further on the question this day three weeks."

In his opinion, perhaps districts other than those named by the Committee might prove the most suitable for yielding an additional supply of water. He thought the Engineer and the Committee had been dazzled by the magnificence of this scheme, and that they were proceeding with too rapid steps. He was not prepared to give up the Thames as a source of supply, and he thought it would be very foolish to come to any such decision. Before the Council voted for the expenditure of such a large sum of money, the opinion of an outside engineer of eminence should be obtained.

Dr. White seconded the amendment.

After some remarks by Mr. J. Stuart, M.P., Lord Tweedmouth, and others, Alderman Beachcroft moved the adjournment of the debate, but the motion was rejected by 3. Later in the debate Mr. Lionel Holland moved the adjournment of the debate until March 17, and, on a show of hands, the motion was adopted.

Petersham and Ham Lands and Footpaths Bill.—The Parliamentary Committee reported that this is described as a Bill to settle certain questions between the owners of the Dysart Surrey estate in the parishes of Petersham and Ham and the Conservators of the Thames, to extinguish certain lammas rights over lands in the parish of Ham, and for other purposes. The Committee stated that they had been asked by the Metropolitan Public Gardens Association to oppose it; and they recommended that, subject to the Parliamentary agent being of opinion that the Council had a *locus standi*, a petition be presented against the Bill.

Mr. Turton declared that the opposition was unnecessary and uncalled for, and moved to refer the report back. He said something like 15,000*l.* was to be given for the lands in question, and the money was to be applied to public objects.

Mr. Fletcher seconded.

Mr. Costelloe said the main parties concerned—the people of London—had not been consulted, and the Council would be guilty of a grave dereliction of duty if they did not lodge a petition, especially as that was the last day on which they could oppose.

The amendment was lost, and the report of the committee was adopted.

Mill-lane, Deptford, Improvement Scheme.—The Public Health and Housing Committee recommended, and it was agreed, that the work of paving the carriage-way and footways of Mill-lane, under the Mill-lane, Deptford, improvement scheme, be executed by the Council without the intervention of a contractor.

Bexley Heath Asylum.—The Asylums Committee reported as follows:—

"We have to report that the plans for this asylum have now received the approval of the Secretary of State. We are advised by the architect that the erection of the asylum will be greatly expedited by at once commencing upon the foundations, which are approximately estimated to cost 35,000*l.*, and being in complete agreement with him on this point we have directed a schedule of quantities to be prepared. The Heath Asylum Sub-Committee recommend us to offer this work to the Works Department to carry out, on a schedule of prices to be prepared by the architect in consultation with the quantity surveyors, but we decided that tenders should be invited from contractors in competition with the Works Department. This course does not, however, appear to be provided for by Standing Orders 289 and 290, and it will be necessary for them to be suspended. We accordingly recommend—

(*a*) That Standing Orders 289 and 290 be suspended so far as may be necessary to enable the Council to deal with the following recommendation.

(*b*) That the Asylums Committee be authorised to obtain tenders from selected contractors and from the Works Department for the foundations of the Heath Asylum, Bexley."

The paragraph of the report was brought up by Mr. Antrobus, Mr. McDougall, the Chairman of the Committee, declining to do so. After a short discussion the recommendations were defeated.

Superstructure, Vauxhall Temporary Bridge.—On the recommendation of the Bridges Committee, it was agreed that the contract drawings and specification for the steel main flooring of the Vauxhall temporary bridge be approved, and that advertisements be issued inviting tenders for the work.

The Kent Water Board Bill.—Much discussion took place on the following recommendation in the joint report of the Parliamentary and Water Committees:—

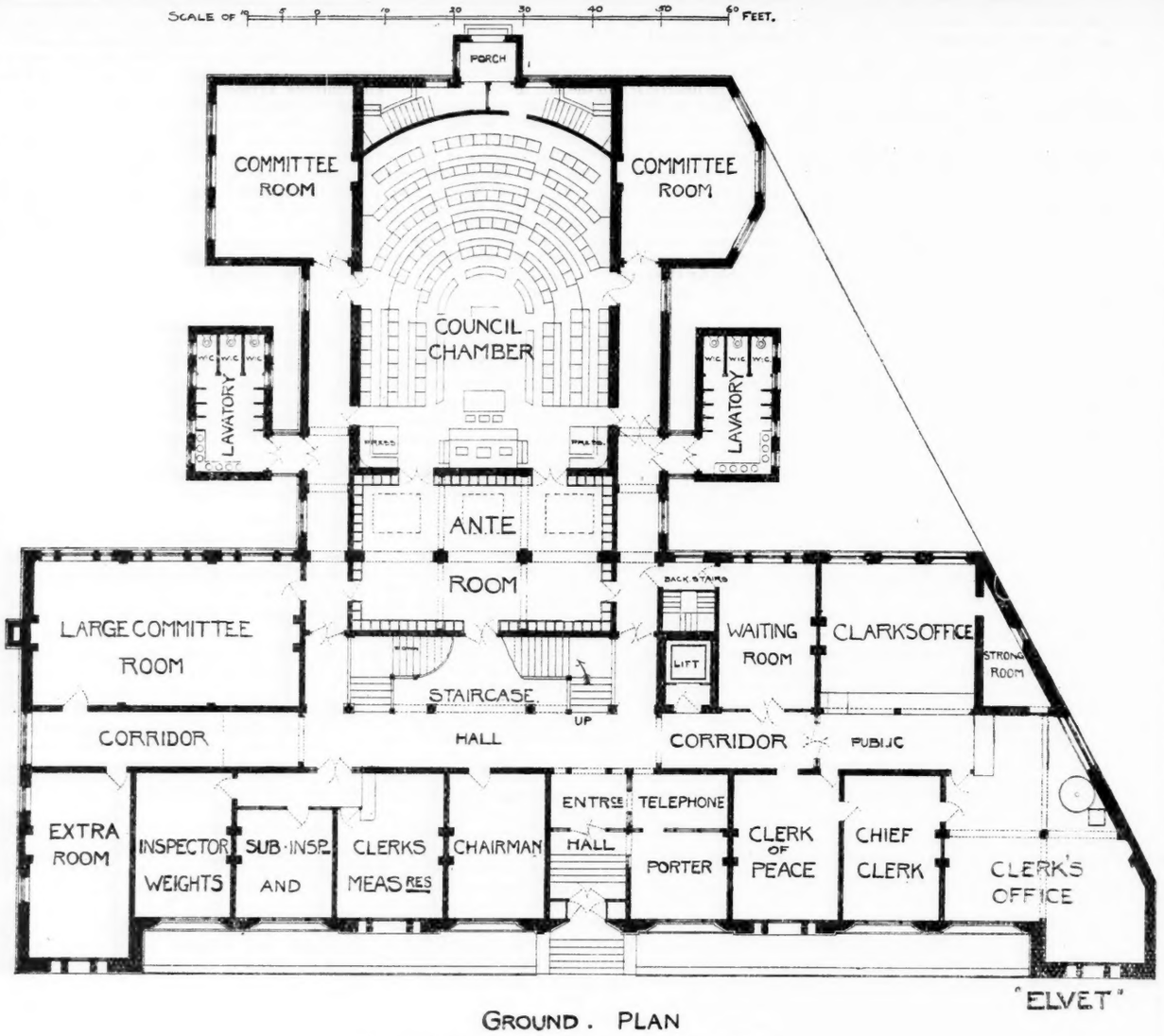
"That the Kent authorities be informed that the Council will not oppose the Kent Water Board Bill on condition that satisfactory arrangements are arrived at with respect to the financial questions involved, and as to the sources of supply, and that to secure such satisfactory arrangements a petition be presented against the Bill."

An amendment, moved by Mr. Beachcroft, to the effect that the Council should lodge opposition to the Bill, and inform those promoting it that it was of opinion that the undertakings of the water companies should be vested in a public authority, was defeated by a large majority, the Committee's recommendation being then approved.

The Council, having transacted other business, adjourned at 7.45 p.m.

ARCHÆOLOGICAL SOCIETIES.

BRITISH ARCHÆOLOGICAL ASSOCIATION.—The sixth meeting of the session of this Association was held on the 19th inst. at 32, Sackville-street, Piccadilly, Mr. Thos. Blashill, Vice-President and Hon. Treasurer, in the chair. The Chairman exhibited a numerous and interesting collection of iron objects. They consisted of horseshoes of different sizes and shapes, one of very unusual form, which covered nearly the whole of the hoof; a boat-hook, a fifteenth century key, some knives and two-pronged forks, and a padlock, the latter of late sixteenth century date. These relics were all found in excavating for the foundations of the new fire brigade station at Whitefriars. Mr. Barrett exhibited a pen-and-ink drawing, nearly full size, of one of several consecration crosses to be seen from the walls of Chedzoy Church, Sedgmoor, Somerset. It is a cross of foliated character, but composed of a group of five pellets at the extremity of each arm, and a further group of five at the intersection of the cross: the date is the fourteenth century. In the absence of the author, Mr. G. Patrick, Hon. Secretary, read a paper by Mr. Walter Money, F.S.A., on the "Parish Registers of Newbury, Berks." These registers are in excellent preservation, and are complete from the date of their institution in 1538 to the present time. The handwriting of the earliest book is remarkably clear and distinct, much better than that of a century later, but the spelling of the names is a matter of the most perfect indifference, the same name appearing in half a dozen different forms in many cases. Mr. Allen S. Walker read a paper upon the church of the Austin Friars in London, which he illustrated by a ground plan, and with charcoal sketches drawn for the occasion. He described the recent discovery of the remains of what he believed to have been the cloister of the Friary Church. Owing to the demolition of a house on the north side of the Dutch church in Austin Friars—the nave of the original building—these remains were brought to light. They consist of a length of wall running north and



GROUND . PLAN

Competition Design for Durham County Buildings.

south, at right angles to the church, some 40 ft. to the west of the site of the north transept. The distance from the nave of the church up to and including the arch, which has remained until recently embedded in the wall of No. 10, Austin Friars-square, is about 80 ft. Mr. Walker remarked that an interesting circumstance in connexion with this archway is that the keystone has ornament upon the western or outer side, and that the mouldings of the lower architrave are continued on the south side as though the arch had stood above and unattached to the adjoining wall, which might very well be the case with an arch leading into a cloister. Several carved bosses of a groined roof were also discovered, and the whole of the remains are in the style of the fourteenth century, at which period the convent was entirely rebuilt.

DRAWINGS FOR THE ROYAL ACADEMY.

As noticed in our last issue, the last receiving day at the Academy for drawings is Monday, March 30; and we shall be glad, as in former years, to deliver at the Academy any drawings which are sent up in time to be photographed for publication in our pages: *i.e.*, not later than the morning of Saturday, March 28. *Drawings sent later than that we cannot take charge of.*

It is necessary that all drawings sent should be in accordance with the Academy regulations, viz. :—

1. They must be in gilt frames.

2. Each drawing must have a label on the back giving the title and the author's name and address.

3. Each must have a hanging label bearin he same information, attached by a cord.

4. Each drawing, or each set of drawings sent by one artist, must be accompanied by a letter to the Secretary of the Royal Academy, repeating the titles and name, as on the labels.

N.B.—We cannot undertake to supply and affix labels; that must be done by the sender or his agent.

Illustrations.

DESIGNS FOR EXECUTION IN STENCIL.

THESE designs, by Mr. Arthur Silver, formed a portion of the illustrations to his paper read at the Architectural Association last week, and reported in another column. They are designed for execution by the Rottman-Silver process, which is described in Mr. Silver's paper.

The designs are identified and classified under the following titles: No. 1 (on our plate) as the "Tulip Garden" frieze; No. 2, the "Portia" frieze; No. 3, the "Benvenuto" filling: No. 4, the "Dromio" frieze; No. 5, the "Hercules" frieze. One or two of them are referred to more especially in the latter part of Mr. Silver's paper, which will be given next week, space not admitting of our publishing the whole of it in the present number.

COMPETITION DESIGN FOR DURHAM COUNTY BUILDINGS.

THIS set of drawings, bearing the motto "Elvet," was one of the first six designs selected by the assessor in the recent competition for the proposed new County Buildings at Durham, and is the joint production of Mr. A. N. Prentice and Mr. A. T. Bolton.

In the following report the architects explain upon what principles they proceeded in drawing up their scheme :—

"The block plan shows that we propose to isolate the new buildings by private roads upon either side, affording light and air to the offices, convenient access to the Constabulary headquarters behind, and for the entrance of the public to the gallery of the Council Chamber. . . .

We have endeavoured to occupy as small an area of the site as possible, leaving room for future extensions, and securing compactness of arrangement as well as economy of outlay. . . .

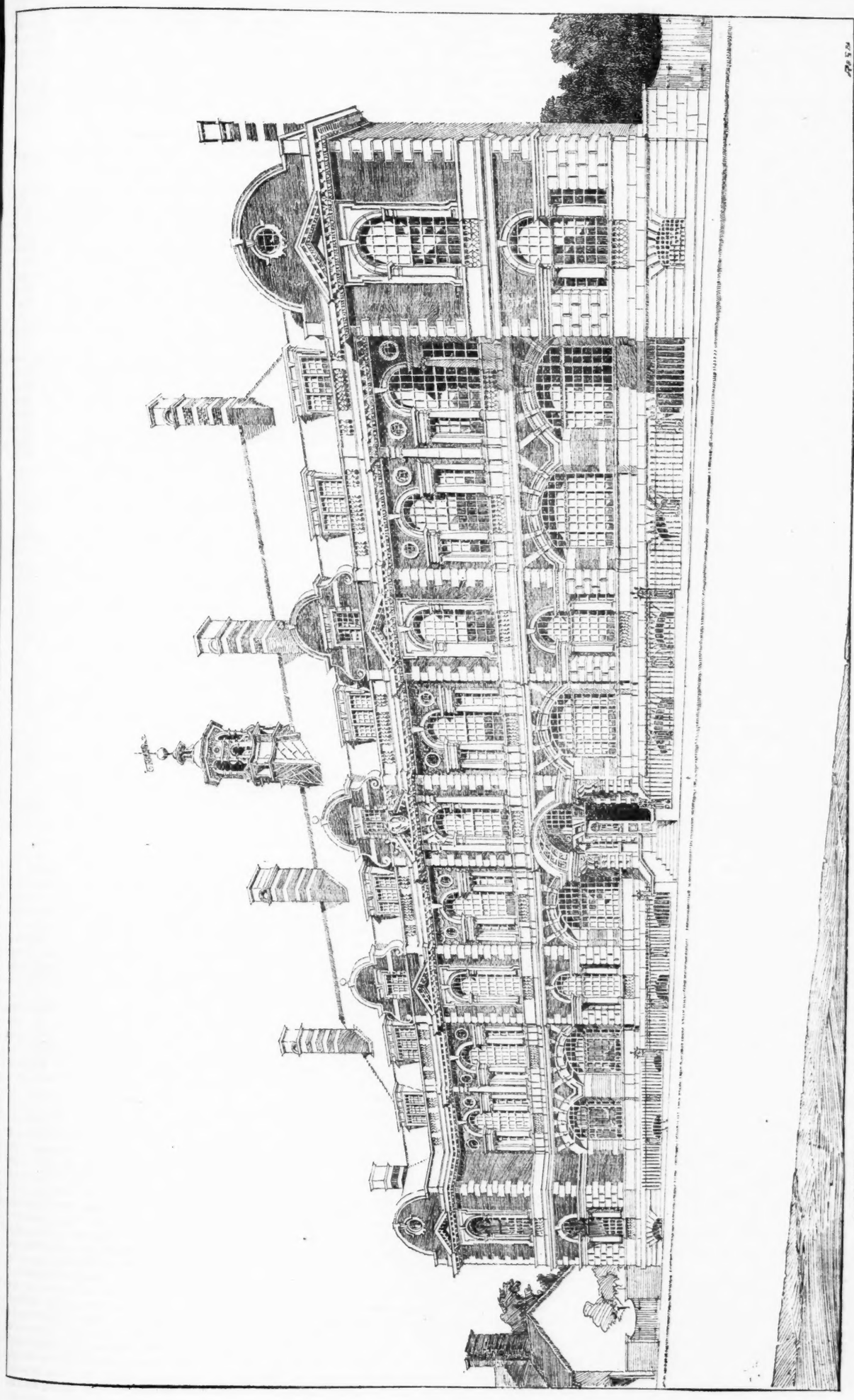
An area 6 ft. wide extends along the front, enclosed by the two end wings, which come out to the building line.

The ground floor is also 5 ft. 6 in. above the street, so that excellent light will be obtained in the basement.

Each department has the rooms asked for, with an extra room on each floor. Our object has been to design a building cheap in form, simple in planning, and easy of construction; one that should be well lit, easy for anyone to find their way about, and not difficult to extend in the future.

We have placed the Council Chamber centrally, but at the back for the sake of quiet, and to obtain all-round lighting by windows placed high up, affording good cross ventilation. An external porch is provided, reached by the west private road; two staircases (divided by a barrier, which prevents the exit streams from meeting) give free passage for the public to their gallery. A pass door, if required, from the corridor at the back of the seats in the chamber, is suggested, controlled by the attendant placed at the entrance outside.

In planning the seating of the Council Chamber the question of easy access to all seats has been carefully considered. By the back and side passages sufficient power of circulation is given, and doors are provided so as to enable members to easily leave or enter to their seats. Doors each side against the reporters' places give them also power of free entry



COMPETITION DESIGN FOR DURHAM MUNICIPAL BUILDINGS.—BY MR. A. T. BOLTON, A.R.I.B.A., AND MR. A. N. PRENTICE, A.R.I.B.A.
EXTERIOR PERSPECTIVE.

and exit. Sloped or stepped passages, with seats on raised steps of 4 in. to 6 in. each, are suggested for the back rows, and each seat is 2 ft. wide, and 4 ft. from back to back, with a 13-in. desk for each person. The arrangements of the London County Council Chamber, which gives satisfaction, as well as those in other similar buildings, have been carefully studied.

In regard to the acoustics of the Council Chamber, a moderate height (27 ft.) has been adopted, with the use of wood in ceiling, panelling, and galleries, which by experience has been found to be the material best adapted for the purpose. It has a strengthening effect on the sound, as in a violin, and we consider that the breaking up of the upper surface of the walls, by galleries projecting in face of the windows, by the bold cornice, and especially by the end gallery for the public, will effectually prevent any echo.

We claim that the method of lighting adopted by us is for this reason (the prevention of echo) far superior to any system of top lighting by lanterns or lay lights.

The panelling below, of a simple character, will be both good for sound, durable, warm, and pleasing in appearance.

It will be seen that while space is provided where decoration to any extent is possible, still the character of the work is such that in its absence the interiors will not be painfully bare.

The ante-room is placed in front of the Council Chamber, opening on to the hall, and thus is best adapted for the purposes of a general lobby. It has lockers, each 3 ft. high by 1 ft. 3 in. clear, and only two rows high, so as to conveniently receive the hat, coat, and umbrella of each member. This room is well lit by three lanterns, and is warmed by radiators placed against the central piers.

Two committee-rooms placed one on each side of the Council Chamber will be available as voting lobbies if so determined; besides being convenient and easy of access both for Councillors and public. The large Committee-room, which is well lit, and has good hanging space for maps. &c., can be easily arranged for the reception of deputations, by placing a bar at one end, where a door for the public approach has been provided. . . .

The main staircases are proposed to be of solid oak or teak as fire resisting, convenient, noiseless, and handsome in appearance; having newels and balusters in the style of the general building, and of a type common in the north, and in Durham itself. This staircase and hall is well lit from above by three lanterns, covered by glass roof, and by a very large window starting from the first floor, where the stairs to the second floor commences, which window extends up to ceiling of that floor. From the ground floor in the hall this window will be seen above, and its south light, admitting the sun, will ncrease the cheerfulness of the interior. This hall has, in common with the offices, been reduced to the most modest size consistent with the purpose and dignity of the building, so as to keep within the limit of cost laid down. . . .

In regard to the style adopted we consider that the quiet character of Old Elvet suggested that your building should be rather remarkable for its solidity of construction, excellence of material, and dignity of expression, rather than for an attempted showiness, foreign to the character of the town. The work of the seventeenth and eighteenth centuries in England has left us many examples of what is known as Anglo-classic, where strength and grace are obtained with the simple use of the universal Renaissance details without any introduction of features unsuitable for the purpose of the building.

The materials proposed are the local Crag stone, a fine textured and warm-coloured sandstone, with Leicester or Fareham best red-facing. The roofs being covered with Westmoreland green slates from the Tilberthwaite quarries. The back and side elevations are proposed to be carried out in a style of great plainness, but some character. The walls to be of local red brick-facing as used in the Constabulary building, with cills of local stone.

CASA HANBURY, VENTIMIGLIA.

THERE are other energies at Ventimiglia than those of the misguided and tyrannical *douaniers* who have made its name odious to the wearied traveller. The population is spreading beyond the interesting old walled town, which rises so picturesquely upon the right bank of the Roya River, to the flat alluvial land on the left bank in the vicinity of the station.

The block of buildings illustrated represents the latest addition in the Via Cavour, erected by the Marchese Hanbury.

It is arranged for the better class local population, who prefer flats for their homes. The ground floor is given up to shops.

The chief departure from local custom consists in a complete system of sanitation introducing the atest English improvements. This is being executed by Messrs. John Barker & Co., of Kensington, as an object-lesson to the natives.

The building will be lighted by electricity.

W. D. CAROE.

THE ARCHITECTURAL ASSOCIATION SPRING VISITS:

HOUSE, PARK-LANE, AND CLARIDGE'S HOTEL, BROOK-STREET.

THE second spring visit was paid on Saturday last to a new house in Park-lane, at the corner of Aldford-street, for Mr. Beit, of which Messrs. Balfour & Turner are the architects. The party were met by Mr. Barrow, the clerk of works, who explained the ⅛-in. scale drawings. On the ground-floor are placed the reception-rooms, Mr. Beit's own rooms being on the first floor, in the form of a complete suite, containing a sitting and breakfast-room, bed room, and bath-room complete. On the second floor is an exactly similar suite. The one-story annexe is an addition to the plan, and provides a winter garden and billiard-room; and here there is some intersected lunette vaulting, to be executed in three courses of tile in cement, finished in plaster, with mouldings at the groins. The flat roof is formed of iron and concrete, and will be covered with a tent for entertainments.

The house proper has a central area for the upper floors, the centre on the ground floor being a long hall ending in the principal staircase, which is of oak, and ascends to the first floor only. The access to the upper floors is by a secondary staircase rising from the basement. The upper floor partitions are in coke breeze concrete, three to one, formed on scaffold-board centering, and having an occasional gas-barrel upright for stiffness. On the ground floor are sliding doors, in some cases worked by overhead gearing, so that by turning the handle of one door, the other also opens. Externally, the stone used is Portland, the ashlar being left from the saw, while moulded work is left rough-tooled, the inside only of the mullions being rubbed and painted in accordance with the decoration of the rooms. The joints are deep—⅜-in. flat pointed. The treatment of the masonry naturally attracted the attention of the party. In the chimney stacks signs of blackening are visible already, and some doubts were expressed as to the greater adherence of dirt owing to this style of execution. Scotch granite, black in tone, is used for the entrance. There is a dual system of electric wiring, providing for either ceiling pendants or wall brackets. Messrs. Trollope are the builders.

At 4 p.m. a good number of the party moved on to the new Claridge's Hotel in Brook-street. In the absence of Mr. Stephens, the architect, Mr. Mills, the clerk of works, met the party and very fully explained the scheme. The soil is clay, and 16 ft. below the main street water is met with; therefore the basement is not deep, the height of the kitchen being 11 ft. 6 in., or 2 ft. more than the rest of basement. The ventilation to kitchen is effected by means of a false ceiling, with extraction from air-space by electric fans to a tall shaft with central iron smoke-flue. The site itself is nearly square, 190 ft. by 165 ft., the building being about 180 ft. by 160 ft. There is a drive in under part of the building to Davies-street. Right and left are two other entrances, one being private and the other forming an entrance to the suite for royalties, which consists of a set of rooms on ground, mezzanine, and first-floor. The central entrance leads to a hall or winter-garden, forming the bottom of a central area to the whole building above. This is to have a glass dome. Below this hall is formed a large wine cellar, with passages lit by the electric light. The coffee and dining-room are to the right, the smoking and billiard-rooms being in front and to the side. These public rooms are to be 20 ft. high. Besides these rooms are 300 sitting and bed-rooms arranged to face the streets and court with central corridor. The principal staircase will be of concrete, faced with marble, the secondary staircases being of concrete. Fletton bricks are used internally for walling, with sawdust bricks for partitions and fixing blocks. The latter are very light and easy to nail to; the sawdust mixed with the clay is burnt out in the firing. A large amount of ironwork is being fixed, costing 13,000*l.*, much of this consisting of cast-iron stanchions to the large coffee-room, which is about 100 ft. by 70 ft., and is divided into three aisles; one of these was pointed out as carrying a load of 450 tons. They stand on a bed of concrete 3 ft. 6 in. deep, which covers the whole site, and have special cast-iron circular bases 6 ft. in diameter, of a special form resembling an an inverted echinus, the metal being 1¾ in. thick, with a bottom thickness of 2½ in. Messrs. Young & Co., of Pimlico, supplied the ironwork. The floors are formed on a plan of the architects, with a permanent centering of very thin special bent sheets of corrugated iron supporting arches of concrete 4 in. thick at the crown, the joists being 4 ft. apart. Ceiling joists are carried by blocking pieces, and finished wito fibrous plaster, the total thickness of floors being 1 ft. 3 in. Externally the building will be faced with Essex bricks as used on the Westminster estate, with rubbed brick dressings, and red Mansfield stone in balconies, &c. Messrs. Trollope are the builders. The cost of the carcase with ordinary fittings is about 120,000*l.*

BUILDERS' CLERKS' BENEVOLENT INSTITUTION.

THE twenty-ninth annual general meeting of the donors and subscribers of this Institution was held at the offices, 21, New Bridge-street, E.C., on the 25th inst., Mr. B. E. Nightingale (the President-elect) in the chair, supported by Messrs. E. Brooks (Treasurer), J. Robson, C. K. Turpin, E. B. Gammon, W. Seymour, B. G. Thompson, F. S. Oldham, O. Newling, and others. Mr. C. Wall, the retiring President, was unable to attend.

After the routine business, the Secretary read the report, and Mr. E. Brooks (Treasurer) the balance-sheets for the past year.

The report stated that the income had been well maintained, the following being the receipts, viz., 272*l.* 9s. 6d. in annual subscriptions, 300*l.* 12s. 6d. in donations, 137*l.* 10s. dividends, and a small amount of 6*l.* 6s. 5d., made up of balance from dinner account and interest on deposit at bank, making together 710*l.* 18s. 5d. There was also received the second moiety of the late Mr. T. Robinson's legacy of 250*l.*, bringing up the total for the year to 841*l.* 18s. 5d. The expenditure was 499*l.* 1s. 3d., including 380*l.* paid in pensions, and 22*l.* 10s. in grants for temporary relief. An election was held in November for two pensioners, there being three candidates. The successful applicants were Mrs. Sophia Lovett, and Mrs. Helena Bishop. Special attention was drawn to the fact of Mrs. Bishop being successful on her first application, this result having been in a great measure due to the fact of her late husband having subscribed for many years to the Institution, which, according to Rule 4, Section 5, enabled her to claim 270 votes, being ten votes for each guinea subscribed by her late husband. One of the pensioners, Mr. Edward Leconte, died during the year, having been elected in 1886. There are now twenty pensioners on the books, the total number elected since the foundation being forty-two. Three children are being educated and well-cared for in the Orphan Working School, by means of the presentations bought by the Builders' Clerks' Benevolent Institution. The annual dinner was held at the Holborn Restaurant on April 9, Mr. Charles Wall, the President, occupying the chair, when over 300*l.* was collected as the result of his earnest appeal.

The President-elect moved "That the report and balance-sheets as read be adopted and printed, together with a list of the subscribers and rules of the Institution."

Mr. F. S. Oldham seconded, and the motion was put and carried unanimously.

A vote of thanks to Mr. Wall and the other retiring officers was then proposed by Mr. Turpin and seconded by Mr. Brooks, reference being made to the successful services rendered to the Institution by Mr. Wall.

On the motion of Mr. B. G. Thompson, seconded by Mr. E. B. Gammon, the new officers were elected, including Mr. Nightingale as President and Mr. Wall as Vice-President.

The meeting closed with a vote of thanks to Mr. Nightingale for his occupancy of the chair.

CARPENTER'S HALL LECTURES.

THE first of the Spring series of lectures at Carpenter's Hall was given on Wednesday night by Mr. H. H. Statham, on "the Façades of the English Cathedrals"; Mr. Alfred Waterhouse, R.A., in the chair. The lecturer said that in all periods of architecture there had been a feeling that the entrance front of a building should be treated with some special breadth and dignity, and that in the case of buildings of the Mediæval church type there was an additional reason for this, as the actual section of a Mediæval cathedral, with the sloping lines of the aisle roofs at the sides, was one which it was very difficult to treat effectively and with dignity as a front elevation. Two favourite types of treatment of the front might be distinguished, one in which a flat façade or mask was erected in front of the three-aisle section, the other in which two towers were erected on the flanks, masking the aisle roofs, while the gable of the centre roof

showed between them. The first was the favourite method in Italy, the second the almost universal method in France; he would therefore distinguish them as the Italian and French methods respectively. Both had been used in England. The façade, while forming a separate design in itself, should nevertheless indicate the three-aisled arrangement in its rear, while it should have a distinctly marked character and a leading idea of its own. A number of views of the fronts of the principal cathedrals were shown by the lantern. In commenting on them the lecturer noticed among other points the effective treatment of the towers at Durham, with their solid base and arcaded upper stories; the curious character of Lincoln, as a combination of both types of front in one design, and the very unusual retention of most of the Norman front when the later additions were made; the unique character of Ely, with its central tower, and the practical reason for adding the later porch, as an abutment to the tower arches; the change made in the projected design of Peterborough front, in order to rival Ely, and the contrast between the grand design of the great arcade and the feeble treatment of the flanking turrets—the one an architect's conception, the other mere mason's work; the failure of Salisbury front from overloading of detail and want of any leading idea, and the superior effect of the far simpler Early English front of Ripon, &c., &c. In referring to the front of York Minster, the lecturer commented on the remarkable unity of the whole design, in spite of the fact that it was built in three different sections at different times, showing plainly that there was a preconceived design and a controlling mind to carry it out, and that it was not built, as some critics said that our cathedrals were, by the consentaneous inspiration of the artisans. Such designs as this, and Peterborough, and others of the fronts, were distinct thoughts in architecture, and must have been the conception of individual minds. A vote of thanks was passed to Mr. Waterhouse for presiding, and he made some remarks arising out of points touched upon in the lecture. There was a large attendance.

COMPETITIONS.

MUNICIPAL BUILDINGS, CLEETHORPES.—The result of the competition for new Municipal Buildings, Cleethorpes, is as follows:—1st premiated design, Mr. G. A. Elphick, Broad-street House, New Broad-street, London; 2nd, Mr. A. R. Mayston, 38, Marquis-road, Stroud Green, London; 3rd, Messrs. Cooksey & Cox, 4, Adam-street, Adelphi, London, W.C. The following plans had no address sent with them:—"Nil Desperandum" and "Dolphin."

ARCHITECTURAL SOCIETIES.

EDINBURGH ARCHITECTURAL SOCIETY.—Mr. Sydney Mitchell delivered his address as Honorary President of the newly-founded Architectural Society in Dowell's Rooms, Edinburgh, on the 19th inst. At the outset he referred briefly to the objects of the Society, and pointed out that it was not intended to supplant any existing societies, but was supplementary to them. It consisted of, and was managed entirely by, students of architecture, and all others, including practising architects, were excluded. He understood that even their Honorary President was forbidden to attend their meetings. He pointed out that an exactly similar society had existed in Glasgow for many years, and had done much good work, and that almost every profession had an institution of this kind attached to it in some form or other. He noted in particular the Royal Medical Society of Edinburgh. Mr. Mitchell urged them to remember that architecture was an art in the round and not in the flat. It was, therefore, necessary to study buildings themselves, both old and new, rather than drawings of them. He drew a parallel between the composer of music and the architect, and pointed out that in both cases the intervention of other hands was necessary before their work could be brought before the public. The composer required the assistance of violinists and the players of instruments of various kinds, and the architect required the assistance of masons and carpenters and others. The composer's score was of no importance as a piece of handwriting, and the architect's drawing was of no importance as a picture. Both were merely means to an end. In the case of a painter the picture was his completed work. It was both beginning and end. In the case of the architect, his drawing was of no importance as a picture. It was merely a beginning, the end was the building itself.

EDINBURGH ARCHITECTURAL ASSOCIATION.—At the last meeting of the Edinburgh Architectural Association a discussion took place on the subject of sanitation. Dr. Rowand Anderson, President, occupied the chair. The Chairman, in opening the discussion, referred to the necessity of architects taking an interest in science, and especially in the science of sanitation. Seeing that water carriage was the accepted method of getting rid of house sewage, great attention had been given to perfecting this system, and plumber work, where fairly paid for and executed, was now as near perfection as it was likely to be until some new system of house sewage was found. It failed, however, in severe frost, as the experience of last winter showed, and it seemed to him that, if further improvement was to be made on the plumber work of houses, it should be in the direction of securing it against damage by frost. The water main in the street should be laid at least four feet underground. Increased precautions must also be taken to secure cisterns against frost, and a simple means of emptying pipes and shutting off the supply from the cisterns should be provided. They ought to aim at some arrangement whereby all the pipes could be kept together and placed in an inside shaft—one that would admit of access to it for examination and repairs; that this shaft should be well-ventilated and situated about the centre of the house, so that all the ventilating pipes could be carried to the apex of the roof, and thus avoid the disfigurement of their buildings. In a self-contained house heat during exceptional frost could easily be applied to this shaft. For tenements he suggested a further development of this idea, and in considering its applicability to houses in flats, other two questions of sanitation came to the front, viz., the proper lighting of the lobbies of such houses, and the accommodation for the domestic servant. At present all the light the lobbies of such houses got came from a fanlight over the stair door, and one or more over the room doors. At the best this only produced visible darkness. The domestic servant was disposed of anyhow in a dark closet. In new property the side of this closet when next the kitchen was, he understood, generally left out. While this gave more light and air to the houses, it still left a most undesirable arrangement. He exhibited sketches showing the present arrangement, and another showing a suggested rearrangement of the interior space. A shaft measuring 10 ft. by 8 ft. 6 in. was placed in the dividing walls, and this would be built with white-glazed bricks. The lobby of the house extended from the entrance door to the wall of this shaft, where was a window not less than 3 ft. wide by 8 ft. high. This would fully light up the lobby. The bath and water-closet of each house were so arranged that they did not face one another, and each had a ventilated and intermediate lobby, a most desirable feature where it could be obtained. The bath-rooms were lighted from this shaft, but did not ventilate into it. There were in the thickness of the division wall upright flues from each apartment, all having their outlet at the apex of the roofs and provided with a mica flap ventilator close to the ceiling to prevent a back draught. Of course, fresh air must be introduced to the bath-room, but there was no difficulty in doing that. The shaft itself must also be provided at the bottom with a supply of air from the outside. The soil and ventilating pipes could be carried up the walls to the apex of the roof, and would be accessible for inspection and repairs. The space now given up to the bath and water-closet he would convert into a room for the domestic servant, with light and air from the outside. They all knew, and many of them had very expensive experience of the destruction to house property caused by the bursting or choking of pipes. As a precaution against damage from such causes he suggested that all bath-rooms and water-closets be kept one above the other, and that the floor be of cement concrete, and so arranged that if there was any flooding it could escape to the outside by means of an overflow pipe. A strip of 2 ft. wide in the kitchen next the sinks would give additional security. It was unnecessary for him to discuss the various methods of treating sewage. He started with this proposition, that there should be no waste, and that what was taken out of the land ought to be returned to it. In Berlin and Paris the problem of the utilisation of sewage was being solved in a satisfactory way, and waste land was being turned into fruitful farms and gardens. While we got rid of our sewage in an easy and expeditious, if wasteful, manner, we were still in a state of barbarism in dealing with house refuse. In dealing with destructors he asked where were they to dispose of the output from their destructors? Clearly not on the top of cultivable land. There were waste lands inland where it could be deposited, but why not run it down to the sea and reclaim by degrees the whole foreshore between Cramond and Musselburgh, barring the mussel beds? Not only should they utilise the city refuse, but he would, in connexion with this, utilise the refuse of their population, as was done at Berlin, where vagrants and tramps were employed at the sewage farms, and it had been found possible to get work out of them, and their health had not suffered. An abundant supply of water was the great essential for maintaining the high state of sanitation they might justly boast of in Edinburgh. While they should have enough for a liberal and unstinted use, everything should be done to check waste. The care and constant supervision now exercised by the authorities, and the better class of fittings insisted on, was reducing that waste materially. Since the introduction of baths into houses, the consumption of water had been enormously increased. It had often occurred to him that there might be a great saving effected here. A spray bath was better and more enjoyable than the ordinary bath, and whereas five gallons of water was sufficient for the former, fifty gallons were required for the latter. In conclusion, Dr. Anderson referred to the housing of the poor, and mentioned other topics to show that the plumber work of a house was not the beginning and end of sanitation.—Bailie Pollard said that, unquestionably, sewage was not disposed of in a proper way, and if the proposal to reclaim the foreshore was practicable, then for a long period of years the disposal of Edinburgh refuse would be pretty well settled.—Mr. Allan expressed the opinion that outside soil-pipes were a failure last winter, because householders persisted in allowing the taps to dribble. For himself, he had never found a soil-pipe freezing unless there was a leak.—Dr. Mackenzie, Leith, said there was no question but that outside soil-pipes and waste-pipes were a disfigurement to buildings, and if any method could be devised whereby the present hygienic advantages could be retained and at the same time do away with the bad lighting of stairs, it would be a great advantage.—Mr. Henry Kerr said there were two great advantages of the well system advocated by the Chairman. In the first place, it got rid of the wretched outside pipes; and, in the second place, there was the vast improvement that the central corridor of the house was well lighted. After further discussion, the Chairman, in reply, said with regard to the well system, he wanted the meeting distinctly to understand that it was not his invention. It was in use in many places, and from inquiries which he had made, he believed it worked uncommonly well.

LEEDS AND YORKSHIRE ARCHITECTURAL SOCIETY.—Mr. Axel H. Haig gave the members of this Society some of his reminiscences of Spain, in the Law Institute, Albion-place, Leeds, on the 24th inst. Mr. E. J. Dodgshun presided. The interest of the audience centred chiefly in the examples of Mr. Haig's work, which were reproduced by means of an oxy-hydrogen lantern. At the conclusion a cordial vote of thanks was given to Mr. Haig.

LEICESTER SOCIETY OF ARCHITECTS.—The annual exhibition of students' works and distribution of prizes in connexion with the Leicester and Leicestershire Society of Architects took place at the School of Art on Tuesday evening, February 25. Mr. E. Clephan presided, and Mr. Pick read an exhaustive criticism of the students' works. Mr. Clephan, after presenting the prizes to the successful students, referred to the excellent criticism passed by Mr. Pick upon the works exhibited. It was a great advantage to the students to have a gentleman of Mr. Pick's experience and ability who was ready to criticise their work.

ENGINEERING SOCIETIES.

ASSOCIATION OF MUNICIPAL AND COUNTY ENGINEERS.—A Metropolitan District meeting of the Association of Municipal and County Engineers was held at the Institution of Civil Engineers, Westminster, on the 21st inst., when the following papers were read: (1) "The Wear of Hardwood Paving and the Weight of Traffic Thereon," by Mr. W. Nisbet Blair; (2) "Wood Paving," by Mr. James P. Norrington; (3) "Some Suggested Amendments of the Metropolis Local

Management Acts." Owing to pressure of other matter this week our report of the meeting will not be given until next week.

Correspondence.

To the Editor of THE BUILDER.

REMAINS OF WINCHESTER PALACE.

SIR,—In your issue of the 4th ult. "H. W. B." remarks, "It is said that the beautiful circular window at the east end of the great hall of the ancient Winchester Palace still exists, and we have more than once asked the question whether any of our readers can give us any information upon the subject. It has been reported that this window, which is engraved in Britton's 'Christian Architecture' and in Sewell, is built up in the wall of a warehouse, where it can still be seen. We have not, however, come across anyone who has seen it." I believe that I have, by accident, lighted upon the solution of the matter, for I discovered the other day that the great hall of the Palace in question was destroyed by fire a dozen years ago or thereabout, and that the wall containing the window, which is described as "a most elegant arrangement," placed in the gable of the great hall, was taken down. My authority is Gwilt's "Encyclopædia of Architecture," new edition, 1888, p. 994. This, of course, accounts for the window's disappearance; I only wonder that the circumstances have not obtained wider publicity.

ALLEN S. WALKER.

The Student's Column.

CARPENTRY AND JOINERY.—VIII.

SHORING AND STRUTTING.

THIS important branch of the craft demands great skill and judgment, occasionally leaving but little time for calculation, and sometimes involving no inconsiderable amount of personal risk. The subject has been much neglected in its theoretical aspect by the architect, who too often leaves the scheme and system of shoring almost entirely to the discretion of the builder's foreman. This is the more astonishing as, in one case at least, a verdict of manslaughter was recorded against an architect, after the fall of a house outside the western boundary of the City of London. Though much must be left to the almost incessant and intelligent watching of the builder and his workmen, more especially in needling operations, still, the architect should give personal supervision both to the design and erection of all temporary wooden supports.

SHORING may conveniently be treated under the following heads:—

I. *Raking Shores.*
II. *Flying, Horizontal, or Dog Shores.*
III. *Needle Shores and Underpinning.*
IV. *Special Forms of Shoring.*

I. *Raking shores* are used when it is required to support a structure either because it is too far away from any other building to use a flying shore, or on account of the owner of the adjoining building objecting to his building being used for the purpose of supporting that of his neighbour. The simplest form of raking shore is that shown in fig. 101, which may be used to support a one-story building. A is the *raking shore*, W is the *wall-piece*, 9 in. by 3 in., and is sufficiently long to take the foot of the strut S. A rectangular hole, 6 in. by 4 in. or 6 in. by 6 in., is cut in the wall-piece at A, into which a *needle* N, which fits the hole, is driven. This is about 12 in. long, and is placed in the wall from which a header has been previously removed. Where possible this should be placed immediately under the floor level. A *cleat* C is nailed to the wall-piece above the needle to assist the latter in resisting the upward thrust of the shore. S P is the *sole-piece* let into the ground, upon which the shore abuts, and to which it transmits the lateral pressure of the wall. In the case of soft or untrustworthy ground, the sole-piece should rest on planks, as shown at P in fig. 102, so as to distribute the weight. The shore is kept in position on the sole-piece by an iron dog D, and by a cleat B.

Fig. 102 represents the raking shore most frequently used in London, and is a natural development of fig. 101 applied to a three-story building. The longest (outside) shore (T R) is called the *top-raker*, the centre shore (M R) is called the *middle-raker*, and the lowest (B S) *bottom shore*. The wall-piece is of course considerably longer. Three rectangular holes are made in it, and the needles inserted and cleats used similar to those previously described. Instead of the struts shown in fig. 101, boards 1 in. thick and 6 in. to 9 in. broad are nailed across the shores and on to the wall-pieces at places adjacent to the needles. The shores at their base are generally either treated in a similar manner or else bound round with hoop-iron.

Fig. 103 shows a system of shoring adapted for a four-story building, with an additional attic story. In this case, which is similar in almost every other instance to the preceding example, the *top raker*, or *riding shore*, as it is more often called in this form, is constructed in two pieces, owing to the inability to procure timber of sufficient length.

Where, however, timber of the requisite length can be obtained, it is almost always desirable to form the shores in one piece, as the power of timber to resist compression is materially affected by any cross strain.

In the case of a frail structure, it is sometimes considered that the manipulation of large timber shores may impair the building, and in such cases it is best to have the rider in two pieces. When this is done, it is best for the top shore to be divided from the lower shore, which should be of the same scantling and resting on the sole piece, by a pair of oak folding wedges.

The design of raking shores may vary slightly in each individual case, but in shoring, perhaps more than in any other branch of carpentry, the same general principles have to be observed. The best angle of inclination for raking shores is generally considered to be 40 deg., but as this involves the use of so much room, they are rarely seen at a less angle than 60 deg. or 70 deg., though, of course, the lateral thrust varies in proportion as the angle is increased. It may be taken as a general rule that one raker is required for every story in an ordinary building, omitting count in the attic story where one exists, and the head of each raker is generally placed against the wall-piece at the level of the floor-joists. Shores should not be placed at a greater distance than from 12 ft. to 15 ft. apart, and if placed nearer together the scantlings may be reduced. The following table will give a general idea of the scantling generally used for each shore when the angle of inclination is between 60 deg. or 75 deg.

	Ft.	Ft.	In.	In.	In.	In.
Walls—	15	to 20 high	4	by 4 or	5	by 5
,,	20	to 30 high	9	by 4½ or	6	by 6
,,	30	to 40 high	12	by 6 or	8	by 8
,,	40	to 50 high	9	by 9 or	8	by 8
,,	50	and upwards ...	12	by 9 or	11	by 9

The following formulæ may be found of use in calculating the compression the shore has to resist, and in arriving at the scantlings:—

(*a*) Let H = the horizontal thrusts in cwts. (see Fig. 101).
W = the weight of the wall in cwts.
t = the thickness of the wall at the base in feet.
NF = the distance of the head of the shore from the ground.

Then $H = \frac{W \times t}{2\,(NF)}$

(*b*) Let V = the vertical force in cwts. (see fig. 101).
θ = the angle the shore makes with the horizon.
W = weight of the shore in cwts.

Then $V = H \tan. \theta - \frac{W}{2}$.

(*c*) Let C = the compression down the shore in cwts.
θ = the angle the shore makes with the horizon.

Then $C = V \sin. \theta + H \cos. \theta$.

(*d*) Let S = safe load of shore in cwts.
a = 15·5 for fir.
d = width in inches of shore.
e = length in feet.

Then $S = a \times \frac{d^4}{e^2}$.

NOTE.—This latter formula, of course, is for square timbers; where one side is greater than the other, take *d* as the lesser and multiply S by $\frac{\text{the greater side}}{\text{the lesser side}}$.

The above calculations are for the top raker. The compression down the lower shores is, of course, greater; but this is considered to be counterbalanced owing to the fact that they are shorter, and their power of resistance is, therefore, greater; it is also more convenient for construction to have them of a uniform size.

With regard to the angle at which the *sole-piece* should be placed with the raker, it is found that the resultant force of V and H (fig. 101) acts in a direction outside the angle made by the shore with the horizon, consequently the sole-piece must not be placed at right angles to the shore itself, but at right angles as near as may be to the direction the resultant may take, which, therefore, is always less than a right-angle.

Fig. 104 is a detail showing the notching of the head of the raker, with the needle and cleat towards the upper end of the wall piece. In the event of a shore being required for any length of time, this notching should always be done; where, however, the shore is of a very temporary nature, it may be secured by iron *dogs*, which are also used for securing the feet of the shores to the sole-piece, for keeping the rider firmly on its lower shore, and also for keeping the various rakers in position. Fig. 105 shows the correct form of dog at A, and the incorrect one at B. In the former case the driving of the dog home brings the shores together, and in the latter case these are driven apart.

A square hole is often cut on the base of raker into which a crowbar is inserted, by means of which it is gently levered into its place on the sole-piece. Fir is the best timber to use for shores, and oak should be employed for the wedges. All joints should fit well, and the timbers should have a good firm bearing on the sole-piece.

Fig. 106 illustrates a very strong combined shore which might be found very useful for some purposes, such as shoring up a retaining wall.

Referring to the triangulation of shores, Viollet-le-Duc says, that "they should always form a triangle or portion of a triangle, for the reason that a triangle can never be thrown out of shape; when braced, shores which are not parallel present an entirely homogeneous resistance, whereas if they are parallel, they will become bent, however well braced they may be." Raking shores have been used for the purposes of pushing a wall back to its original vertical position, by placing powerful screwjacks under the sole-pieces. This of course could only be effected where the foundations are sound, everything being disconnected and shored up on the other side; it is not a method to be recommended.

II. *Flying shores*, also called *dog and horizontal shores*, are very convenient to use when the distance between the two adjoining houses does not exceed 33 ft., beyond which length Dantzic fir cannot easily be obtained.

The usual method of erecting these shores is shown in fig. 107. Two rectangular holes are cut in the centre of each of the wall-pieces, and the needles N are then inserted, as previously described for raking shores, and a cleat (C) is nailed below them to help sustain the pressure.

Oak wedges (O W) are driven between the wall-piece and the horizontal strut, and above the needles. The raking struts R S help to distribute the pressure and to stiffen the main strut. They rest against straining-pieces S P, nailed to the upper and under sides of the horizontal strut, and against cleats, C, on the wall-pieces. Sometimes needles are let in before the cleats are fixed, thus affording additional security, and oak wedges are used (O W) to tighten them up to the straining-pieces.

In flying shores, the trust of flying shores may be calculated as follows:—

Let H = the thrust in cwts.
W = the weight of the wall in cwts.
t = thickness of the wall at ground in feet.
AF = the distance in feet from the ground to the point at which it is desired to find the thrust.

Then as before $H = \frac{W \times t}{2\,AF}$

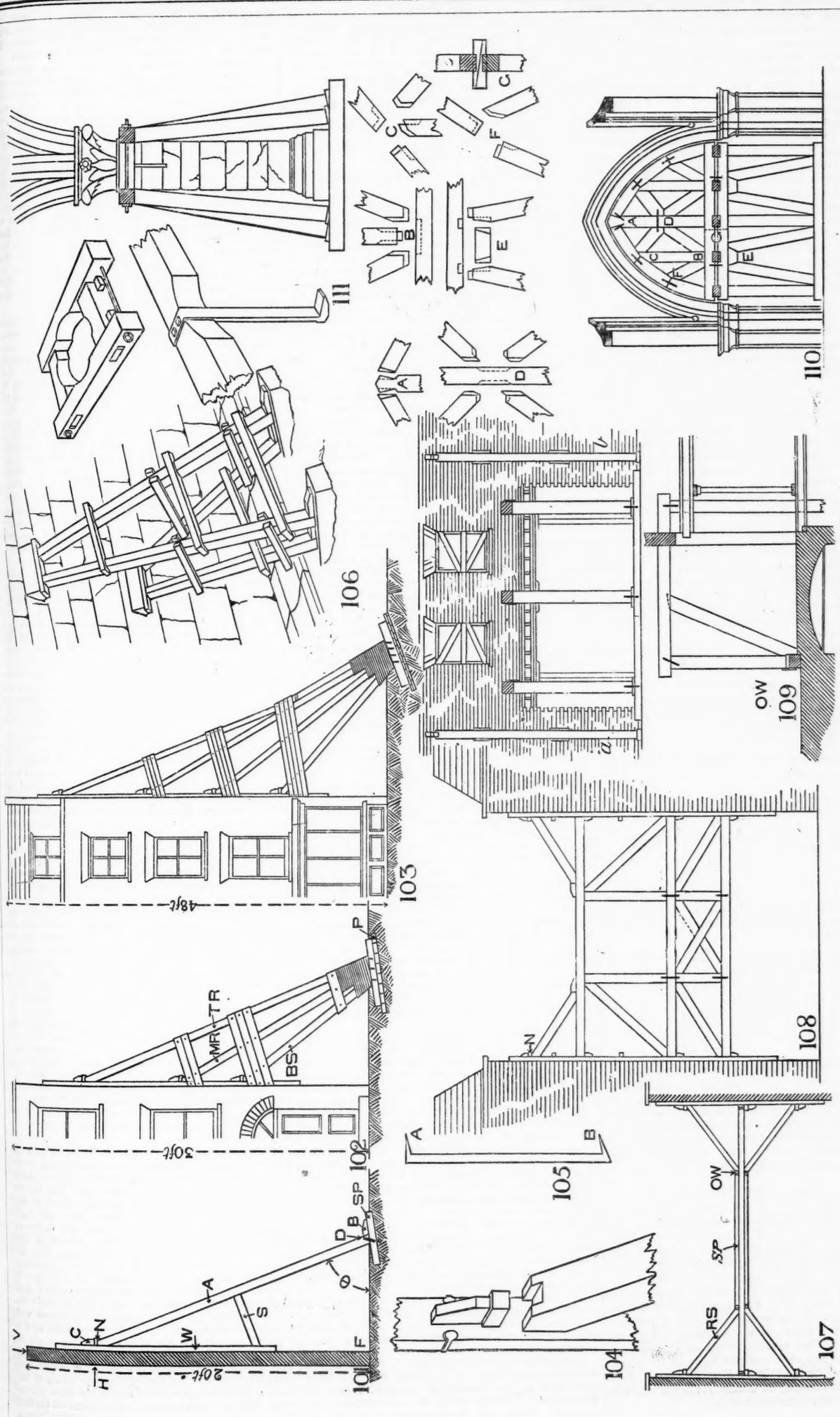
Of course, the higher the shore is up the wall, the less will be the compression, and the lower the shore is placed, the stronger it must be. Very often more than one flying shore is required, and Fig. 108 shows a system of flying shores, one above the other, with a continuous wall-piece. This latter, if the wall is of an uneven character, should be firred up behind, so that it may have an even bearing throughout. The following table of scantlings is usually considered to be adequate.

For spans not exceeding 15 ft., raking struts, 4 in. 4 in.; horizontal struts, 6 in. by 4 in.

For spans from 15 ft. to 33 ft., raking struts, 6 in. by 4 in. to 9 in. by 4½ in.; horizontal struts, 6 in. 6 in. to 9 in. by 9 in.

The above scantlings apply to shores placed one-fourth of the total height from the top of the wall, and each bay of shoring should not be more than 12 ft. 6 in.

Flying-shores have the advantage over raking



Illustrations to Student's Column: Chapter VIII. Shoring and Strutting.

101. Raking Shore; simplest form. 102. Raking Shore; most frequenly used. 103. Raking Shore; adapted for very high buildings. 104. Detail, showing notching of head to needle. 105. Correct and Incorrect Form of Dog. 106. Strong Combined Shore. 107. Flying Shore. 108. System of Flying Shores. 109. Needling required to support a wall. 110. Special Form of Shoring used at Grosmont Church. 111. Shoring used to support Cap of a Cylindrical Column.

shores of taking the direct thrust, and of not interfering so much in building operations.

III. *Needle Shores and Underpinning* differs from the previous methods described in that the foundations are no longer relied upon, and the wall under treatment has to be held up in the air without any direct support from the ground. Rectangular holes are cut in the brickwork, through which baulks of timber, generally about 12 in. by 12 in., are passed, and these are supported at each end by vertical posts of similar scantlings, resting on sole-pieces, which are usually laid on timber platforms on the ground. Oak wedges are then inserted under the uprights, and on being driven home, these force the needle tightly against the upper side of the brickwork in the cavity. These needles should not be placed more than about 6 ft. apart, and when all are in position they support the wall so that the lower part may be removed, and, as is often the case, a shop front or other structure may be inserted underneath.

Figs. 109 represent the needling required to support a wall during the insertion of a girder for some such purpose as indicated above. If the wall is perfectly sound, no raking shores would be required; but if this should not be the case, it would be advisable to have a raking shore at *a* and *b*, and one between the windows; in any case, the windows should be shored up as shown. The needles should be inserted above the floor level so as to have a grip on the solid brickwork, and, in the case of there being a basement, the vertical support should go straight through the ground floor to the solid ground beneath.

Care should be taken to support all floors, chimney breasts, piers and corbels in the walls to be needled, and these latter should be so arranged as not to interfere in any way with the insertion of brestsummers, girders, or stancheons used in the alteration. Whole timbers should nearly always be squared, for, though in most cases they are considerably stronger than necessary, still the slightest deflection might cause small fissures in the upper structure. The following formulæ are generally recognised as sufficient :—

To find the scantling of the needle that will sustain a given safe load in the centre :—

Let L = length of bearing in feet.
W = weight to be carried in pounds.
A = ·01 for fir and ·013 for oak.
B = breadth in inches.
D = depth in inches.

To find depth where breadth is known or determined upon :—

$$D = \frac{\sqrt[3]{L^2 \times W \times A}}{B}$$

To find breadth where depth is known or determined upon :—

$$B = \frac{L^2 \times W \times A}{D^3}$$

To find the scantling of vertical posts capable of sustaining a given compression in the direction of their length :—

Let L = length in feet.
W = weight to be sustained in pounds.
A = ·0013 for fir, ·0015 for oak.
B = breadth in inches.
D = depth required in inches.

$$\text{Then } D = \frac{\sqrt[3]{L^2 \times W \times A}}{B}$$

If a wall be sound except for its foundations, it can be restored to a perfectly good condition by firstly erecting raking shores to assist in supporting the wall. The ground on each side of it is then dug out for not more than about 5 ft. to 7 ft. at a time; the whole of the existing foundation is then removed and a new foundation built upon the solid ground. This is called *underpinning*.

IV. *Special Forms of Shoring* are often required which must be left to the skill of the architect and the builder to adapt or devise as the case may require, and it is not intended in this brief article to do more than refer to these special designs. Fig. 110 and those numbered A to G represent the system adopted by Mr. J. P. Seddon at the parish church of Grosmont in Monmouthshire. Fig. 111 represents the shoring suggested for the support of the cap of a cylindrical column which carries vaulting ribs in all directions. This would permit of the column being taken away and another built in its place. As to timbering used in shoring, an allowance of one-third to one-half is usually made for waste in shoring or for reconversion to use.

OBITUARY.

M. FRÉDÉRIC CHASSERIAN.—This venerable French architect has just died at the advanced age of ninety-four. He entered at the Ecole des Beaux-Arts in 1824, and was successively employed in Voirie Department, at the Hospital at Alexandria, and in the "Direction des Travaux" at Marseilles. From 1845 to 1882 he was in continuous employment on the principal modern buildings at Algiers, including the municipal theatre of the town, which was a most successful work.

GENERAL BUILDING NEWS.

COCKERMOUTH ALL SAINTS' PARISH ROOMS.—The committee who have in hand the work of erecting parish rooms in connexion with All Saints' Church, Cockermouth, have selected the designs submitted in competition by Mr. G. D. Oliver, Carlisle, and it is understood that the work will be proceeded with immediately. The site of the intended rooms is occupied at present by the old school which was attended by Wordsworth in his early boyhood. It is an Elizabethan structure, and an old panel upon the building with inscription and a tablet in the interior will be preserved in the new rooms. Mr. Oliver's design shows a building of quaint appearance after the Elizabethan style. The accommodation provided includes two class-rooms, kitchen, and retiring-room on the ground floor, and large hall and ladies' retiring-room on the first floor. It will be of local stone, with green slate roof.

SALISBURY STOCK EXCHANGE, RHODESIA.—New Stock Exchange Buildings at Salisbury, the administrative capital of Rhodesia, are now in course of construction, says *South Africa*. The buildings, when completed, will contain a large exchange hall, 100 ft. by 40 ft., board-room, bar, lavatories, and a large number of offices, and is estimated to cost not less than 8,000*l*. The designs are by Messrs. Jones & Christie, architects, of Cape Town, who were the successful winners of the first premium of 100*l*., which had been offered for the best and most suitable designs. There were eight other competitors.

BATHS, ABERDEEN.—The new Bathing Station at the Aberdeen Links, designed by Mr. John Rust, City Architect, is expected to be ready for opening by April. The building, which measures 110 ft. long by about 48 ft. wide, is built of red pressed Welsh brick, from Ruabon, in North Wales, with fire-brick yellow dressings at the corners. Both front and back elevations are alike, except that the front of the lower elevation facing the sea is mainly of glass. The features of the building are the four square towers which rise from the corners of the central block. Another prominent feature is the central ventilator or tower which springs from the centre of the main building and rises to a height of 50 ft. The blue slating on the roof is relieved by the red ridging. Both in front and at the back there is a covered verandah. In the central block facing the sea there is a refreshment room 36 ft. by 18 ft., fitted up in the form of a bar, and lined with wood all round to the height of 9 ft. At the back of the refreshment-room are retiring-rooms for ladies and gentlemen, entered either from a side passage or from a door from the Links in the west elevation. On either side of the retiring-rooms are baths for ladies and gentlemen—four first-class and four second-class for each, making sixteen baths in all. All the baths are of enamelled fireclay, the first-class baths having tile floors and tiles on the walls, and both being fitted up with showers and sprays and wash-hand basin. The second-class baths are similarly fitted, except that there are no showers, and that the floor is of coloured concrete instead of tiles. Both salt and fresh water will be supplied. The space underneath the bath and refreshment-rooms has been utilised for a boiler-house, pump-room, kitchen, scullery, drying-room, wash-house, &c.

BOARD SCHOOLS, SHEFFIELD.—On the 17th inst. the Chairman of the Buildings Committee of the Sheffield School Board opened the new departments for girls and infants at the Lancasterian Board School. The new building will accommodate 330 girls and 313 infants. The infants are placed on the ground-floor, and have a well-fitted schoolroom, and there are four class-rooms, each for sixty scholars, teachers'-rooms, cloak-rooms, lavatories, &c. The girls have the upper floor, and have three class-rooms, each for sixty scholars, in addition to a schoolroom. The whole of the rooms in each department can be thrown into one auditorium for general exercise and meetings, by means of the single-action sash partition. The warming and ventilation have been carried out by Mr. William Key, of Glasgow. Messrs. W. & A. Forsdike were the contractors; the asphalte playgrounds have been laid by Mr. John Hadfield; Mr. J. Laidler has acted as clerk of works; and the architect is Mr. C. J. Innocent, Sheffield.

RESTORATION OF SINGLETON ABBEY.—The restoration of the burnt wing of Singleton Abbey is, it is stated, to be proceeded with at an early date, Mr. T. P. Martin having received the architectural commission.

ASYLUM BUILDINGS, PARCGWYLLT, GLAMORGANSHIRE.—A new block of buildings has just been completed at the Glamorgan County Asylum at Parcgwyllt. The new wing will accommodate 120 females. There will be accommodation now at Parcgwyllt for nearly 800. Messrs. Willcock, of Wolverhampton, were the contractors for the work; Mr. A. E. Gough, of London, was the architect; whilst Mr. W. Davidson was clerk of the works.

BUSINESS PREMISES, IPSWICH.—New premises for Mr. E. Beard have been erected at the corner formed by the continuation of William-street through Crown-street (formerly Clay-lane) to the Tower Ramparts. On the ground floor, a range of plate-glass windows, 80 ft. in length, is divided off into show-rooms for different classes of goods. Beyond this series of rooms, at the William-street and Tower Ramparts' corner of the block, space has been provided for four Pantechnicon vans. On the ground floor of the stores there are also three workshops, respectively for cabinet-makers, upholsterers, and polishers. On the second floor, which is approached by a broad staircase, a portion of the area has been partitioned off as a workshop for upholsterers and upholsteresses, &c.; but all the rest of the space, comprising 43 000 cubic feet, is reserved as the furniture storage department. The building was planned by Mr. T. W. Cotman, and was constructed by Messrs. Parkington & Son.

ST. LUKE'S CHURCH IMPROVEMENTS, SOUTHPORT.—At a recent meeting held under the presidency of the Vicar of St. Luke's, in the schoolroom in Windsor-road, with reference to the proposed improvements, the chairman called upon the architect, Mr. Huon Matear, and Mr. Finchett to lay before the congregation what was proposed to be done to the interior of the church. By this complete scheme it is proposed to build vestries, to lengthen the chancel, improve the organ, build a chancel wall and pulpit, to effect certain improvements in the sanctuary, to refloor the nave, to ventilate and heat the church, and to erect choir-stalls. The entire scheme is expected to cost 5,000*l*. The architect recommended that that portion of the scheme relating to the elongation of the chancel should be omitted. This suggestion was subsequently adopted, and a resolution was passed unanimously, by which it was decided that the part of the work recommended be done.

RESTORATION OF ROLLESTON CHURCH, NOTTINGHAMSHIRE.—The ancient church of Holy Trinity, Rolleston, has just been restored. Nothing now is left of the original Saxon structure; the oldest part of the building, the south doorway, being an example of Early Norman work. In its present condition the edifice consists of a nave and aisles of four bays, a chancel of considerable length, a western tower, and south porch. The nave arcades are Early English, with clustered piers of different forms, and are surmounted by a clearstory of the latest Perpendicular work. The aisles and chancel are of Early English architecture, and the former have Perpendicular windows inserted in parts. The windows in the chancel, however, have, with one exception, been altered by the use of tracery of a later Decorated type. The rocky condition of the tower was, prior to its restoration in 1890, such as to necessitate the taking down of the fine peal of bells. The present operations were commenced a little over six months ago. The whole of the south aisle has been entirely rebuilt. The old materials were used as far as possible, and where necessary the more decayed parts were replaced by Ancaster stone, the roof being of pitch-pine. The original style of architecture was adhered to as closely as possible. The windows have also been reglazed. The chancel-arch, which was formerly exceedingly low, has been raised 3 ft. 6 in., and the cap of the adjacent pillar has been renovated. The remaining pillars of the south arcade are in a rather better state of repair, but where necessary they have been properly repaired. The whole of the church, including the nave and north and south aisles, has been newly floored with red and white Mansfield stone, laid in herring-bone pattern. The whole of the pillars have been underpinned, to admit of the excavation of the foundations. They now rest on beds of solid concrete, 4 ft. square and 2 ft. deep. The south porch has also been entirely rebuilt. The architect for the work has been Mr. Naylor, of Messrs. Naylor & Sales, Derby. Mr. B. J. Ashley, of Newark, was entrusted with the masonry; Mr. R. Lee, of Averham, undertook the woodwork; and the plumbing and glazing was undertaken by Mr. Bousfield, of Newark.

NEW PREMISES, OLD-SQUARE, BIRMINGHAM.—The directors of Newbury's have taken on lease from the Improvement Committee the plot of land at the corner of the Old-square and the Upper Priory, Birmingham, for the purpose of enlarging their premises, extending from the old Gas Company's offices (which are now the business premises of this company) to the school in the Upper Priory. Considerable alterations will be made, says the *Birmingham Post*, in the appearance of the Old-square, as the clearing of the site will involve the removal of the old Probate Court, and other premises, and the Upper Priory will be widened about 15 ft., and the new buildings will have a concave frontage from the new corner of the Upper Priory to the old Gas Offices, the angle in the square at present existing thereby disappearing. The new buildings will be five stories in height, and comprise basement, extending over the whole of the site; a ground-floor shop of nearly the same dimensions, together with extensive showrooms on the first floor, warehouses on the second floor, and workrooms

on the third floor. The shop fronts will have an arcaded appearance, and be continued round the old Gas Offices and along the Minories, giving a total frontage of about 300 ft. The entrances will be four in number, the principal one being in the centre of the frontage to the Old-square, two in the Minories, and one in the Upper Priory. The first floor will be appropriated as show-rooms, and will be provided with a refreshment-room for the use of customers. A free Renaissance style of architecture has been adopted for the exterior, which will be ornate in general character, the principal façade across the angle of the Old-square being surmounted by a large circular dome, flanged by two smaller ones, placed at the corner of the Upper Priory and next the old Gas Offices respectively. The portion of the old Gas Offices which was originally used as workshops will be taken down and a new block erected, and as the company have decided to retain the stone-faced part of the old premises, the general lines of the cornices and floor levels will be continued in the new parts, so that when the old stonework is cleaned down the buildings will present an appearance of a complete block. The buildings will be fitted with an electric-light installation. The architects are Messrs. Essex, Nicol, and Goodman.

MAGDALEN COLLEGE SCHOOL, BRACKLEY, NORTHAMPTONSHIRE. — On the 18th inst. the foundation-stone of a new wing to this school was laid by Mr. Edward Chapman, Fellow, Magdalen College, Oxford. The new wing consists of a porch, hat and cloak-lobby, &c., to the school, and a large sitting-room and three bedrooms for masters on the ground floor, whilst the upper floor has a big dormitory and sanitorium for boys (consisting of sick room, nurses' room, bath-room, water-closet, &c.) complete in itself. The new wing will correspond in design with the existing old wing, the walls being faced with local and Handborough stone and Box ground dressings, and the roof being covered with Naunton stone slates. The contract amounts to 1,394*l.*, and is being carried out by Messrs. Benfield & Loxley, of Oxford, under the architect, Mr. Thos. Garratt, of London. Messrs. Hart, Son, Peard, & Co. supplied the trowel with which the foundation-stone was laid.

SCHOOL, MELEDOR, CORNWALL.—St. Stephen's-in-Branwell School Board has provided a new school at Meledor. The new school, which is to accommodate the children of the outlying districts of the parishes of St. Stephen's, Ladock, and St. Enoder, has been built for eighty children from the design of Mr. Hill, of Redruth, and the work has been carried out by Messrs. Gilbert (masonry) and Curra (carpentry).

ENLARGEMENT OF POLICE STATION, MARYPORT. —The Police Station at Maryport is to be considerably enlarged by the erection of a new Court House, magistrate's retiring-rooms, and suitable accommodation for witnesses, &c. The plans have been prepared by Mr. Geo. Dale Oliver, of Carlisle, the County Architect. New lock-ups are also to be built for the County of Cumberland at Harrington and Kinkry Hill from the designs of Mr. Oliver.

PROPOSED REBUILDING OF ST. JAMES'S SCHOOLS, DONCASTER.—It is stated that the Great Northern directors have offered the Rev. E. H. Bennett, the vicar of St. James's, Doncaster, a lump sum (5,000*l.* is the amount mentioned) for the rebuilding of St. James's or Plant Schools, recently destroyed by fire, and that the vicar has accepted the offer. A girl's school, to accommodate 300 scholars, will be built on the old site, adjoining St. James's Church; and a boys' school, to accommodate 350 scholars, will be built on a site at the corner of Stirling-street and Green Dyke-lane. Mr. Simmons, of the firm of Messrs. Brundell, Simmons, & Brundell, has been entrusted with the preparation of the plans for the new building.

CHURCH SCHOOLS, WEST MOORS, DORSET.—New schools have just been opened at West Moors. The work has been carried out by Messrs. Hayward & Worcester, of Bath, from the designs of Messrs. Adye & Adye, of Trowbridge.

CHAPEL, ST. LUKE'S CHURCH, LEAMINGTON.—A new chapel in connexion with St. Luke's church has just been opened at Leamington. The architect was Mr. F. Foster, of Leamington, and the builder was Mr. T. Pratt.

WESLEYAN SCHOOL-ROOM, LEOMINSTER. — A new Wesleyan school-room has just been opened at Leominster. There are two class-rooms at the further end of the building, and these can either be shut off from the room or opened into it, and the room opens to the old school-room, which has undergone considerable alteration. It is estimated that the new room will accommodate 200 people. The architect was Mr. G. E. Davies (Hereford), and the builder, Mr. J. Watkins (Leominster).

CHURCH, THAXTED, ESSEX.—A committee has been formed for the purpose of carrying out the reparation of the parish church of Thaxted, Essex; a building well known, and possessing more than local interest from the fact of its being probably the finest specimen of ecclesiastical architecture in the county. It is stated that, unless the necessary work be shortly taken in hand, there is danger of irreparable damage being done through decay. The committee have secured the services of Mr. Richard Creed, architect, who has made a careful inspection of the fabric, and prepared an approximate estimate of the cost of the necessary work. Mr. C. E. Kempe has been consulted respecting the ancient glass, which is in a precarious condition, and greatly needs preservation; and his services have been secured. A sum of between 5,000*l.* and 6,000*l.* at the least will be required to complete the whole work; but the committee feel that they will be in a position to make a beginning when about a third of that sum has been collected.

NEW LIBRARY, HEREFORD CATHEDRAL.—According to the *Hereford Times*, the erection of the new library at Hereford Cathedral has been made possible by a bequest for that purpose of 4,000*l.* from the late Canon Powell, of Hinton Court. The site which has been selected is, as far as can be ascertained, the actual original site of the Mediæval Library up to the year 1589. The new building will be in the same style as the cloisters on the east and south side of the Close, and will consist of three bays. Over the cloisters will be a room of somewhat similar character to the tower over the east cloister known as the "Ladye Arbour," and which contains the archives of the Dean and Chapter. The new room, however, will extend over three bays of the cloister, instead of over one, as the present tower does, and will be 43 ft. long by 16½ ft. wide. This room will be reserved for the valuable old missals and mediæval works now to be seen in the celebrated Chained Library situated in the Archive Chamber over the east side of the north transept, and will be reached by a turret staircase on the west side of the west cloister, the cloisters beneath being used as a modern library. The stone used in the building is brought from the Luston Quarry, near Leominster, from which quarry much of the material was excavated for the building of portions of the Cathedral. Both the upper and lower rooms will be heated with hot water pipes. At the same time the Dean is having restored the two bays at the west end of the south cloister, and to annex them to the new building, so as to make a good place of meeting and a reading and writing room for the use of the clergy of the Cathedral and diocese. The architect is Sir Arthur Blomfield, A.R.A., and the builder Mr. Thompson, of Peterborough.

BOARD SCHOOLS, PLYMOUTH. — New Board schools are being erected in the North-road, Plymouth. The building is two stories in height, and has been erected in the Elizabethan style. The principal elevation is in the North-road, and has a frontage of nearly 120 ft. The walls are of local limestone with the natural face showing, on a plinth of Dartmoor granite, the window and door dressings, and copings being of Ham Hill and Portland stone. Internally, the school, which is intended for infants and girls, has been planned on the central hall principle. On each floor is a hall running the entire length of the building, with three class-rooms on each side opening into it, and divided from it by sliding glass doors. On the ground floor, where the infants will be taught, are two porches—east and west—with large cloak-rooms adjoining. One of the class-rooms, on the south side of the ground floor hall, will be used exclusively for babies. It has been provided with a separate entrance from Boon's-place, has its own cloak-room, and can be kept altogether distinct from the infants' department. Two staircases of granite, supported on steel joists—one at each end of the building—lead to the girls' school above, the general arrangement of which is similar to that below. The ground-floor hall and class-rooms have wood block floors on the herring-bone pattern, and the lobbies and cloak-rooms are laid with tiled pavements. On mezzomine floors, approached from the staircase at the north-west angle of the building, are private rooms and lavatories for the mistresses and pupil teachers. The basement, under the infants' cloakroom, at the south-east corner, contains the boiler-room and cellars, and on the mezzomine floors above are various store and cistern rooms. The building will be heated throughout by hot-water pipes in coils on the low pressure system. The foul air will be carried off by means of zinc tubes, encased with pitch-pine, to exhaust ventilators fixed in the roof. All the class-rooms will be fitted with dual desks constructed on a plan designed by the Board's clerk of works, Mr. J. W. Trevan. On the south side of the building is a tar-paved playground with the necessary offices and covered sheds. The premises have been built by Mr. James Julian, of Truro, from the designs and under the direction of Messrs. Hine & Odgers, architects. Mr. Best, Plymouth, has supplied and fitted the heating apparatus, and Mr. James Rider is the clerk of works.

SANITARY AND ENGINEERING NEWS.

MANCHESTER SHIP CANAL.—The following is the Engineer's Report of works carried out during the last half-year, appended to the general Report just issued:—"Dredging operations have been continued without intermission during the half-year. The balance of the deposits of silt which had accumulated in the tidal portion of the Canal during construction has been removed. Large quantities of silt have passed into the Canal over the sills of the tidal openings, the removal of which has kept, and is keeping, the dredgers in that section constantly employed. The works for the permanent electric lighting at the docks are well advanced towards completion, and are now in partial operation. The new hydraulic installation at Mode Wheel is also in a forward state, the engines being in course of erection. The warehouses, which are being erected by the Manchester Ship Canal Warehousing Company, Limited, are so advanced that some of the floors of five of the warehouses are being used for traffic purposes, although the buildings are not completed. The sidings for the accommodation of traffic at the north-western junction at Weaste have been connected with the new line of the London and North-Western Railway, and the junction is being used for the conveyance of traffic to and from the docks. The works at Butchersfield and Woolston for the more ready passage of the waters of the River Mersey, from the Canal through Warrington, have been completed and are in operation. The new deep water jetties and coal-tip at Runcorn are nearly complete, and will shortly be in use. Various small works required for the equipment of the Canal and docks have been completed, and others are in progress. Considerable additions have been made to the protective work of the Canal slopes, and the slope generally are in good condition. The works throughout the Canal have been efficiently maintained, and are in good order."

WATER SUPPLY, SELKIRK.—A report on Selkirk water supply was recently submitted to the Police Commission by a special Committee. The Committee had three different schemes under consideration—the improvement of the present pumping scheme, a new pumping scheme at Howden, and a gravitation scheme from Lewinshope Burn, in the Yarrow valley. Messrs. Leslie & Reid, Edinburgh, reported on the last that for a supply of 360,000 gallons per day the total estimated cost would be 16,700*l.* The second scheme, capable of pumping 300,000 gallons in ten hours, was estimated by the same firm to cost 12,575*l.* The estimated cost of improving the present pumping scheme, as reported by Messrs. Aimers & Sons, Galashiels, as far as can be ascertained at present, is 13,262*l.* 10s. After a long discussion, on the motion of the Provost, seconded by Mr. Stoddart, it was agreed by a majority to ask Messrs. Leslie & Reid to make the necessary survey and borings in connexion with the gravitation scheme, and submit a detailed report of the approximate cost.

ENLARGEMENT OF THE LEEDS SEWAGE WORKS. —At the January meeting of the Leeds City Council, a resolution, moved by Ald. Harding, was adopted, calling on the Streets and Sewerage Committee to report as early as practicable on the condition and efficiency of the Knostrop works, and as to any proposal for effectually dealing with the sewage of the city they might have under consideration. The members of the Streets and Sewerage Committee, accompanied by the City Engineer (Mr. T. Hewson) visited, on the 19th inst., the Knostrop works. It appears that in dry weather the sewage flow is about 15,000,000 gallons a day. The precipitating tanks are, however, only able to deal with 2⅝ millions of gallons at a time. After duly considering all the circumstances, the Committee decided that the City Engineer should prepare plans and specifications, and obtain designs and tenders for new engines and boilers to supersede those at present in use. The new machinery is to be of 1,000 indicated horse-power, and there is to be the necessary stand-by for use in case of a break-down. Mr. Hewson submitted general plans providing for further tanks, and the Committee requested him to prepare working plans and specifications on the same lines, and to obtain tenders for the construction of ten additional tanks, capable of holding altogether 5,000,000 gallons of sewage.

RESERVOIR, PERTH.—At a meeting of the Perth Water Commission on the 20th inst., the Water Manager's specifications for the construction of an additional reservoir at the Burghmuir were considered. The new reservoir, which has been designed by Mr. Davidson, the Water Manager, is to hold almost the same quantity of water as the three present reservoirs combined when full—viz., 1,800,000 gallons. It is to be erected alongside of the present reservoir at the Burghmuir, which is the highest of the existing three, and can command the whole city in case of emergency. The cost will be from 4,000*l.* to 4,500*l.* Mr. Keay moved the adoption of Mr. Davidson's specifications, and that it be remitted to the Waterworks Committee to take in offers within a month. Mr. Keiller seconded. The motion was carried unanimously.

MISCELLANEOUS.

KING'S COLLEGE.—On Tuesday last Professor Banister Fletcher delivered a lecture on "Architecture" in the theatre at King's College. He commenced by explaining how mere building could be made into architecture, and then how architecture could be reduced into mere building. This part of the subject was illustrated by nine large diagrams. He then contrasted the leading features of the various styles of architecture, illustrating the subject by drawings, made to the same scale, of typical buildings in each style.

GLASGOW HIGH SCHOOL BUILDING CLASSES.—Mr. D. Bennet Dobson's High School Construction Classes on Saturday last visited the new Sanitary Chambers and new Savings Bank, Glassford-street. This latter building will cost about 30,000*l.*, and

entails a very large scheme of reconstruction. Mr. Muir, representing Messrs. Burnet, Son, & Campbell, the architects, very courteously conducted the students, who afterwards visited the Sanitary Chambers. This is being built principally for Mr. Fyfe's department, and will cost about 18,000*l.* The style adopted has been a free and bold treatment of the later Renaissance. Mr. Lockhead, Mr. A. B. McDonald's assistant, explained everything fully.

THE MOSAICS AT ST. PAUL'S.—On the 20th inst. Mr. W. B. Richmond, R.A., delivered a lecture on "The Decoration of St. Paul's Cathedral," at the London Institution. The lecturer, in his prefatory remarks, dealt with the causes which had for two centuries delayed the execution of the scheme of decoration, and which showed that England was not ready for her re-marriage with art, from which, since the sixteenth century, she had been divorced. Having next referred to the work done oy Alfred Stevens, G. F. Watts, Lord Leighton, and Mr. E. J. Poynter in the preparation of designs, and to the erection of the reredos, he said it was upon the advice of the eminent firm who had accomplished this latter work that he (the lecturer) was asked to undertake the task he was now engaged upon. From the first he decided that there was only one way in which the decoration could be carried out, and that was in mosaic. Against mere pictorial mosaic, however, he firmly set his face, resolving to adhere to the methods of the classical Byzantine period and to follow the great masters in accuracy of drawing and nobility in choice of forms. Another feature was that the whole of the work had been carried out by English craftsmen, and he was proud to say that, although these craftsmen had to be found out and literally taught to work on the lines of the Byzantine mosaic builders, they had proved the equal of any that Italy or the Continent could produce. Mr. Richmond spoke in some detail as to the initial difficulties which had to be overcome. The lecturer referred with gratification to the growing interest which the workmen took in their task so soon as they grasped the essential principles which he was seeking to apply in this work. They worked with the delight of free craftsmen, unhampered by the soul-destroying conditions which the existence of the commercial contractor or "middleman" would have imposed on their labour. Mr. Richmond, in conclusion, gave many details as to the amount of work already achieved.

THE COLLECTION OF DUST.—The Islington Vestry having, in accordance with the requirements of the London County Council, instituted a weekly collection of dust throughout the parish, numerous complaints have been made of inconvenience and annoyance as a consequence of the importunity of dustmen to enter houses where little or no dust had accumulated for them to remove. Refusal of admission was construed by the Public Health Committee of the local vestry as "obstruction" under Section 116 of the Public Health (London) Act. The Magistrate at Clerkenwell Police-court, before whom, at the instance of the Committee, a recalcitrant ratepayer was brought, dismissed the summons on the ground that the defendant's refusal to receive a dustman was not "obstruction" within the meaning of the section. The Magistrate will state a case, and the Public Health Committee decided on the 19th inst. to recommend an appeal to a superior Court, having regard to the importance of the point at issue. So far as Islington is concerned, there is a widespread feeling of resentment against the local and central authority alike for threatening householders with pains and penalties when, in the occupier's fancied discretion, they decline to admit a dust collector every time he calls. —*The Morning.*

GLASGOW AND WEST OF SCOTLAND TECHNICAL COLLEGE.—ARCHITECTURAL CLASSES.—The third visit this spring of the students attending these classes took place on Saturday afternoon last to the Pathological and Laundry Buildings, Western Infirmary. There was a large attendance of students, and they were conducted over the buildings by Mr. Douglas, the clerk of the works. At the close, Professor Gourlay proposed a hearty vote of thanks to Messrs. John Burnet, Son, and Campbell, the architects, for their kind permission to visit the buildings, and to Mr. Douglas for his guidance.

SOCIETY OF ARTS.—Professor John Millar Thomson delivered the second lecture on "The Chemistry of certain Metals and their Compounds used in Building," at the Society of Arts on Monday last, the 24th inst. It had special reference to the general nature of alloys, and in discussing questions regarding them the lecturer stated the difficulty in deciding whether many are simple solidified solutions, or whether they are to be regarded as solutions of compounds of the metals dissolved in excess of one or other of them. The most novel part of the lecture consisted in a photograph by Röntgen rays of the internal structure of an alloy, which was thrown on the screen. We believe that this is the first time the possibilities of these "invisible rays" have been shown in public in connexion with the subject of alloys. In the near future these rays are destined to play an important part in enlarging our knowledge concerning them. The action of common acids on metals was given in some detail, and it was shown that this depended on the nature of the metal, the temperature, and the strength of the acid employed. The chemical properties of iron, the formation of both ferrous and ferric compounds, the passages of lower into higher oxidised conditions, and the nature of rust were fully explained. Copper compounds were next dealt with, and the formation of coloured metallic substances thereon fully gone into, more particulary in reference to the relations subsisting between the colour and composition of the metal. Not the least interesting part of the demonstration was the action of deposits of carbon and of sulphur compounds in deteriorating coatings on copper.

REREDOS, ST. JAMES', UPPER EDMONTON.—A new reredos was on Tuesday last unveiled at the this church. The reredos, which is the work of Messrs. Jones & Willis, is composed of Caen stone, marble, and alabaster, and has been erected under the supervision of Mr. Edward Ellis, architect, for Mr. J. R. Anning, of Burnside, Upper Edmonton.

CHANGE OF ADDRESS.—Messrs. Colledge & Bridgen, lock manufacturers of Wolverhampton, have moved from their old address in Retreat-street to Powlett-street. The name of the "Midland Lock Works" is retained at the new address.

APPOINTMENT OF SANITARY INSPECTORS.—The Local Government Board has sanctioned the appointment of Messrs. B. A. Knappett and J. Daltry as Sanitary Inspectors in Lewisham.

ELECTRIC LIGHT IN AN EDINBURGH CHURCH—Augustine Church, George IV. Bridge, Edinburgh, has been wired for electric lighting. The installation has been carried out by Messrs. Lowden Brothers, of Dundee.

EXETER AND DISTRICT BUILDERS' ASSOCIATION: ANNUAL DINNER.—The annual dinner of the Exeter and District Builders' Association was held on the 20th inst. at the Bude Hotel. The Sheriff (Mr. F. T. Depree), the President of the Association, presided. The usual loyal and patriotic toasts having been honoured, Dr. Danger proposed "Success to the Trade and Commerce of Exeter." He said that in the olden days there were certain crafts in the city which had great prosperity. So far as the citizens were concerned these crafts were now extinct. There was, however, a way in which the city, he believed, could be improved—viz., by getting as much as possible of the outlying custom into Exeter. This could be aided, for instance, by making a railway from Chagford to Exeter. The citizens of Exeter would be making a great mistake if they did not do their utmost to promote the best interests of the proposed line. In reference to railway rates, the railway companies must be brought to understand that they were ruining English trade by their high rates.—Mr. D. Wilson was the first to respond. He said that during the past year there had not been any difficulties with strikes or the troubles which existed in Exeter a few years ago. The Chamber of Commerce and the Trade Protection Society were doing an excellent work for Exeter builders. Mr. J. Sampson, who also responded, said he was not so despondent for the trade of the city of Exeter as some people were. Exeter was no worse off than other cities or towns of its size. The building trade was certainly in a more prosperous state now than four or five years ago.—Mr. A. Lucas submitted "The Aldermen and Members of the City Council." In the course of his remarks, he said he believed that it was a mistake for the Council to undertake work which should be left to private individuals. Often this work could be more cheaply performed by private builders.—The President submitted "Success to the Exeter and District Builders' Association." He said for several years it had been the privilege and pleasure of the Sheriff to be the President of the Association, which was doing great good. From what he could gather, it endeavoured in some degree to revive the old Guilds which existed years ago in nearly every city of importance in the kingdom. The Association's object was the maintenance of the builders' trade, and the general well-being of its members. Their trade was an important one, and they could do much good by combination. By combination they could protect themselves while doing justice to those in their employ. Mr. J. R. Gibbard, who responded, said the Association was started in 1885. There was still work for the Association to do as regards better arrangements for contracts, specifications, &c. This year there had been no disagreement with the workmen. The building trade throughout the country was improving. Mr. J. Bolley gave "Our President." The Sheriff acknowledged the toast. Other toasts followed.

BOOKS ON THE BUILDING TRADES IN THE LIVERPOOL FREE LIBRARY.—The Liverpool papers state that in various ways the Free Libraries' Committee have been endeavouring to make the institutions under their care both increasingly popular and useful; and their efforts have thus far been attended by no small measure of success. Not least important has been the effort to acquaint the artisan with a knowledge of the great resources of the reference library, which, if fully utilised, should result in a considerable increase in his proficiency as a craftsman and advance his material prosperity not a little. To this end special hand-lists, giving particulars of the various technical books in the library, have from time to time been issued and gratuitously distributed, with the result that the books upon the industrial arts have been in much greater demand than formerly. The most recent publication of this character dealt with the books on architecture, and that having been received with many manifestations of approval, has now been supplemented by a "Hand List of Books on the Building Trades." This hand list also is issued for gratuitous distribution, and may be procured by those persons practically connected with the building trades upon application to the chief librarian.

HULL MASTER BUILDERS' ANNUAL DINNER.—The annual dinner of the members of the Hull Master Builders' Association was held at the Grosvenor Hotel, Carr-lane, on the 20th inst., under the chairmanship of Mr. T. Goates, the President of the Association. The loyal and patriotic toasts having been honoured, Mr. G. H. Panton proposed the toast of "The Mayor, Sheriff, and Corporation of Hull." The Mayor, in reply, said he was somewhat surprised to learn that the Hull Builders' Association was one of the largest of the kind in the kingdom, and he was pleased to be assured that during the past year they had had no serious dispute with their workmen. He had been somewhat surprised to learn that the works at the Hull Borough Asylum were being executed by workmen from a distance, and he suggested that a conference should be arranged between masters and men to see if difficulties in regard to certain regulations which existed could not be removed so that work which was done by the Corporation of Hull could not be done by Hull men for the benefit of the ratepayers. Proceeding, the Mayor condemned the railway level crossings of the town, and said it would be cheaper to pay the North-Eastern Company a good sum to get rid of these great obstructions. The Sheriff also responded.—Mr. Gaskell then proposed "The Hull Master Builders' Association," which he said embraced almost every individual connected in any way with the building industry. He hoped it would long continue a strong tower of usefulness amongst them. The President, in responding, said, with regard to labour and capital, he trusted that one would be the handmaiden of the other, and that they would assist each other in the pathways of life. Mr. J. Townsley proposed "The Architects," Mr. J. Watson acknowledging the compliment. Other toasts were honoured.

SALISBURY CATHEDRAL TOWER AND SPIRE.—Sir Arthur W. Blomfield has furnished the Dean and Chapter of Salisbury with a supplementary report, from which it appears that the sum now required for strengthening the tower and spire will amount to 15,000*l.* In his report Sir Arthur states that from an examination of the foundations of the Cathedral he discovered that the solid chalk was reached at a depth of 33 ft. from the level of the ground in the Close. At the surface there is a bed of alluvial soil about 4 ft. in thickness; then comes a stratum about 15 in. thick of white clay, below which are found gravel and flints down to the chalk. This bed of gravel, some 28 ft. in thickness, is constantly full of water, which at present stands in a trial hole almost to the top of the clay, and in floods and wet seasons rises considerably higher. As far as he has yet seen, the foundations of the Cathedral are not carried through the clay bed, but rest upon it. They are for the most part of rough, unsquared stones, and have very little spread of footing. After explaining that he proposes to strengthen the foundations by cement concrete, to form a solid bed round them, he refers to the bulge in the piers in the great tower arches which span the nave, and adds that he can find no indication whatever of any recent movement.

CAPITAL AND LABOUR.

THE DISPUTE IN THE NEWCASTLE BUILDING TRADE.—At a meeting of the members of the Master Builders' Association, held at the County Hotel, Newcastle, on the 19th inst., to consider the dispute at present existing between the plasterers and bricklayers as to the laying of cement floors, the following resolution was unanimously adopted:—"That in future the employers will use their own discretion as to who they will employ to lay cement floors." There was also a very strong feeling expressed against the action taken by the Bricklayers' Society in withdrawing their men from certain works, as there is no dispute at present existing between the employers and the bricklayers. It was also felt that steps should be taken for the prevention of these arbitrary actions in future, and that arrangements should be made by the Masters' Association to take immediate united action upon their recurrence.

LEGAL.

THE LANDS CLAUSES AND RAILWAY CLAUSES CONSOLIDATION ACTS, 1845, AND ANCIENT LIGHTS:

IMPORTANT JUDGMENT IN THE COURT OF APPEAL.

THE case of Emsley *v.* the North Eastern Railway Company came before the Court of Appeal, composed of Lords Justice Lindley, Kay, and A. L. Smith, on the 20th inst., for judgment on the appeal of the plaintiff from an order of Mr. Justice North in the Chancery Division refusing to restrain, by interlocutory injunction, the respondents from erecting certain buildings in connexion with alterations in the joint station of the North

Eastern Railway Company and London and North-Western Railway Company at Leeds, so as to obstruct the plaintiff's admittedly ancient lights. The main defence of the respondents was that they were acting within their statutory powers, and that the plaintiff's only remedy was compensation under the Lands Clauses Act, 1845. The facts sufficiently appear from the judgment.

Lord Justice Lindley in delivering judgment said that the plaintiff appealed from an order of Mr. Justice North refusing to restrain the defendants (the respondents) from interfering with his ancient lights. The lights were ancient. The defendants were building a parcel-office at Leeds, and this building would, to some material extent, darken the ancient lights of the plaintiff. The new building was nearly completed before the action was commenced, and was carried up to its full height, or nearly so, when the notice of motion for an injunction was served. Mr. Justice North did not, however, refuse the injunction, upon the ground that it would be useless as regards future buildings, nor upon the ground that it was too late to order the building to be pulled down. He decided against the plaintiff on the ground that the respondents were entitled to erect the new building under statutory powers, and that the plaintiff's remedy was not by an action, but to obtain compensation under the Lands Clauses and Railway Clauses Consolidation Acts, 1845. The appellant contended that this view of the case was wrong, and that even if he was not entitled to an injunction, at all events he would be entitled to damages in the action when it came on for trial. The question thus raised was of great and general importance. But before discussing it, he would shortly state the circumstances with which they had to deal. In 1865 the respondents obtained Parliamentary powers to make a new station at Leeds, and to connect it by lines of railway with other railways to which it was unnecessary further to refer. The special Act conferring this power incorporated the Lands Clauses Consolidation and Railway Clauses Consolidation Acts, 1845, and declared that their interpretation clauses were to apply to it; gave power to make the stations and works therein particularly mentioned; fixed three years as the time within which the powers for compulsory purchase and taking of lands were to be exercised; and fixed five years for the completion of the works authorised by the act. He would assume with Mr. Justice North that this section applied to the station, although not expressly mentioned in it. The Act further contained a section specially applicable to the piece of land on which the respondents were erecting the new parcels office, and which was referred to as No. 57 (Section 24), which provided for the widening of Neville-street, Leeds, if required by the Corporation of Leeds. The Corporation of Leeds did not give notice to the respondents under this section, and allowed the time for giving such notice to expire. The company, however, bought the land, and then widened, or allowed the Corporation of Leeds to widen, the street. The consequence of that was that a considerable part of No. 57 was retained by the respondents. For some years the piece so retained was not wanted for either lines of rails or for other purposes connected with the company's works. But the company clearly had power to buy the whole of No. 57 for the purposes mentioned in the special Act. Section 24 assumed that the company might have bought No. 57 under their general power, and provided that if they had not done so the company should—on proper notice being given by the Corporation of Leeds—buy so much of No. 57 as the Corporation might want in order to widen Neville-street. He (his Lordship) could not accede to the contention that the company had no statutory power to acquire No. 57 except to enable the Leeds Corporation to widen Neville-street, nor to the contention that the company's other statutory powers did not extend to No. 57 at all. Under the Act of 1865 the company built a new station and constructed the extension railways then contemplated, but the station becoming inconveniently small, the company in 1891 obtained another special Act, authorising them to enlarge the station, and to acquire more land for that purpose. The terms of that Act, said his Lordship, were very important. The preamble recited that it was expedient that the company should be empowered to extend the Leeds New Station, and to acquire the lands therein described; Section 2 incorporated the Lands Clauses and Railway Clauses Consolidation Acts, 1845; Section 4 confirmed the powers necessary for the purposes of the Act; Section 16 fixed five years as the period for building the works; and Section 26 expressly enabled the company to extend the Leeds Station, and for the purpose thereof to enter upon and use the lands there referred to. The five years mentioned in Section 4 were still unexpired. The company had acquired, under the Act of 1891, land adjoining that which the company had previously acquired under the Act of 1861. The company had pulled down a great part, if not the whole, of the station and offices (including the parcels office) which had been constructed under the powers of the Act of 1865, and the company had rebuilt and enlarged the old station and offices, using for the purpose land acquired under the Act of 1865, and the additional lands acquired under the Act of 1891. The new parcels office, of which alone the plaintiff complained, was built partly on the vacant piece of land, No. 57, acquired under the earlier Act, and partly on an adjoining piece of land acquired under the later Act. The plaintiff's (the appellant's) first contention was that the new parcels office was not necessary for altering and using the railway and works authorised by the special Acts within the meaning of Section 16 of the Railway Clauses Consolidation Act, 1845, even if it applied to the case. His Lordship said that the evidence filed by the company proved the contrary, and was really quite conclusive on that head. The plaintiff also contended that as the new parcels office was not on the site of the old one, the new one could not be regarded as a substitution for the old one within the meaning of Section 16. There, again, the evidence and plans disposed of that contention. The difficult part of the case was in determining whether in building the new parcels office the company ought to be regarded as exercising statutory powers, or only the ordinary rights of a land-owner. If the former, the action could not be supported, and the plaintiff's (appellant's) remedy would be to seek compensation under the Lands Clauses and Railway Clauses Consolidation Acts; if the latter, although he might fail in obtaining a mandatory injunction, he would be entitled to damages at the trial. His Lordship held that a railway company when it had acquired land on which its rails were laid, required no statutory power to run trains over it, but the company did want statutory power to do so in such a way as to commit an unavoidable nuisance without being exposed to actions for damages, and the company had such a power accordingly in this particular instance. Moreover, the person injured had no remedy either by action or by compensation under the Consolidation Acts. His Lordship further said on the point raised, as to whether the time within which the statutory powers conferred on the company by Section 16 of the Railway Clauses Consolidation Act, 1845, had expired, that it had never yet been decided that this power could not be exercised after the period for building the works had expired, and he was not prepared to be the first to hold that it could not. For these reasons he thought that the appeal must be dismissed with costs.

Lord Justices Kay and E. L. Smith concurred, and the appeal was accordingly dismissed with costs.

Mr. Balfour Brown, Q.C., and Mr. H. Terrell appeared for the appellant; and Mr. Swinfen Eady, Q.C., and Mr. J. G. Butcher for the Railway Company.

THE SMOKE NUISANCE.

ON the 25th inst., at the Westminster Police Court, Mr. W. R. Renshaw, of Queen Anne's Mansions, Queen Anne's-gate, was summoned as the manager of the Queen Anne's Mansions Lighting and Heating Company, whose works are situate as above, for allowing dense black smoke to issue from a chimney-shaft on various days in December and January last.

Mr. Percy Gye prosecuted for the Vestry of St. Margaret and St. John, Westminster, and called Mr. Dee, the Sanitary inspector, and a constable to depose that on many days volumes af black smoke were seen issuing from the chimney-shaft.

Mr. Renshaw said that he had done everything in his power to abate the nuisance, but Mr. Gye said the company had been twice before fined for the same offence.

Mr. de Rutzen said the nuisance was apparent to anyone living in the neighbourhood, and it would certainly have to be stopped. He imposed a fine of 20*l.* and 5*l.* cost.

MEETINGS.

FRIDAY, FEBRUARY 28.

Institution of Civil Engineers (Students' Meeting).—Mr. Arthur S. Butterworth on "Loughborough Sewage-disposal Works." 8 p.m.

SATURDAY, FEBRUARY 29.

Sanitary Institute (Lectures for Sanitary Officers).—Inspection and Demonstration of Disinfecting Apparatus and Model Steam Laundry, at St. John's Wharf, Fulham. 3 p.m.

Builders' Foremen and Clerks of Works' Institution.—Annual Dinner, Holborn Restaurant. 6 p.m.

Edinburgh Architectural Association.—Visit to the M'Ewan Hall.

MONDAY, MARCH 2.

Royal Institute of British Architects.—(1) Special general meeting to elect the Royal Gold Medallist for the current year. The Chairman to move that the Royal Gold Medal for the promotion of architecture be presented this year to Mr. Ernest George, Vice-President, for his executed works as an architect. (2) Ninth general meeting (business) for the election of candidates for membership under By-laws 7, 8, and 9. 8 p.m.

Royal Academy of Arts.—Lectures on Sculpture, by Dr. A. S. Murray: "The Art of Asia Minor." I. 4 p.m.

Surveyors' Institution.—Adjourned discussion on the paper read by Mr. A. A. Hudson at the last meeting, entitled "The Conditions of Building Contracts." 8 p.m.

Society of Arts (Cantor Lectures).—Professor J. M. Thomson on "The Chemistry of Certain Metals and their Compounds used in Building, and the Changes Produced in them by Air, Moisture, and Noxious Gases, &c." III. 8 p.m.

Society of Engineers.—Mr. T. H. Brigg on "The Mechanics of Horse Haulage." 7.30 p.m.

Sanitary Institute (Lectures for Sanitary Officers).—Dr. H. R. Kenwood on "Nature of Nuisances, including Nuisances the Abatement of which is Difficult." 8 p.m.

TUESDAY, MARCH 3.

Institution of Civil Engineers.—Mr. W. H. Wheeler on "Littoral Drift in Relation to River-Outfalls and to Harbour-Entrances." 8 p.m.

Society of Biblical Archæology.—Mr. Theo. G. Pinches on "Assyriological Gleanings." 8 p.m.

Imperial Institute (East Hall).—Dr. Max Ohnefalsch-Richter on "My Twelve Years' Stay in Cyprus." I. 5 p.m.

London School of Economics and Political Science (9, John-street, Adelphi).—Mr. E. J. Harper on "The Rating Question: Incidence, How it may be Gauged." 6.45 p.m.

WEDNESDAY, MARCH 4.

Architectural Association (Discussion Section).—Mr. Edwin O. Sachs on "Architects and Urban Fire Protection." 7 p.m.

British Archæological Association.—Paper entitled "Notes on Mediæval and Renaissance Architecture in France," by Mrs. Collier. 8 p.m.

Carpenters' Hall, London Wall.—Lecture by Mr. W. H. Preece, C.B., on "Electricity in Connexion with Buildings." 8 p.m.

Royal Archæological Institute of Great Britain and Ireland.—(1) Viscount Dillon on "Feathers and Plumes"; (2) Mr. H. S. Cunynghame on "The Possible Arabian Origin of Gothic Characters, derived from an Examination of the Methods of Writing used by the Arabs." 4 p.m.

Sanitary Institute (Lectures for Sanitary Officers).—Inspection and Demonstration at the London County Council Common Lodging House, Parker-street, Drury-lane. 3 p.m.

Society of Arts.—Mr. A. A. Campbell Swinton on "Röntgen's Photography of the Invisible." 8 p.m.

Liverpool Engineering Society.—Mr. D. J. Howells on "Water Tube Boilers." 8 p.m.

Glasgow Architectural Association.—Annual Business Meeting. 8 p.m.

THURSDAY, MARCH 5.

Royal Academy of Arts.—Lectures on Sculpture, by Dr. A. S. Murray: "The Art of Asia Minor." II. 4 p.m.

Society of Antiquaries.—Ballot for the election of Fellows. 8.30 p.m.

Society for the Encouragement of the Fine Arts.—Mr. E. Doran Webb on "Our Rude Forefathers, 200–600 A.D." 8 p.m.

Sanitary Institute (Lectures for Sanitary Officers).—Dr. J. F. J. Sykes on "Objects and Methods of Inspection." 8 p.m.

FRIDAY, MARCH 6.

Architectural Association.—Mr. Hervey Flint on "Masonry (Practical Stonework)." 7.30 p.m.

Auctioneers' Institute.—Mr. A. J. Ram on "Valuations and Appraisements." 8 p.m.

SATURDAY, MARCH 7.

Architectural Association.—Visit to the Northampton Institute, St. John-street-road, Clerkenwell, E.C. 3 p.m.

Sanitary Inspectors' Association.—Annual Dinner, Holborn Restaurant. 6 p.m.

Sanitary Institute (Lectures for Sanitary Officers).—Inspection and Demonstration at Harrison & Barber's Knacker Yard, Whitechapel. 3 p.m.

RECENT PATENTS:

ABSTRACTS OF SPECIFICATIONS.

1,632. — FLUSHING CISTERNS: *A. Clifford.* — An apparatus for preventing waste of water, consisting of a vertical discharge pipe enclosed in a metal cylinder by means of which the water is syphoned from the cistern. A valve is situated near the bottom of the cistern, between the discharge pipe and its outer cover, and is capable of being raised by a chain passing over pulleys, at the same time forcing the water contained in the circular space above it into the discharge pipe and starting the syphonage.

3,403.—HINGES: *R. Morgan.*—For gates and doors. Consists in forming the eyes or pivots with screwed shanks, adapted for screwing either direct into the door or gate or into metal clips secured to same. By this means the hang of the gate can be adjusted. For closing the barrier automatically the bearing surfaces of the hinges may be bevelled.

4,137.—SCAFFOLDING: *A. Jones.*—A scaffolding for temporary work is constructed from a horizontal tie-bar having a curb at one end and a cross piece at the other, with a strut hinged at one end to the tie-rod and having a cross piece at the other, both cross pieces being bent at their extremities to clip one at the front and the other at the back of a ladder or other support, a chain connecting the inclined strut with the horizontal tie-bar.

4,373.—HINGES: *J. Adey.*—A hinge intended chiefly for railway carriage doors, is made with the centre knuckle detachable from its flap by means of a connected pin which fits in a socket formed in said flap. The two joint pieces upon the other flap are bored out to a larger diameter and screw-threaded. The pin is cone-shaped at each end, and a corresponding coned socket is screwed into the threaded joint pieces. By this means slackness from wear may be compensated.

4,993.—FIREGRATES: *S. Ferry.*—Means for feeding fuel to domestic and other firegrates, upwards from the bottom. The back of the grate is formed with a curved extension at the bottom which reaches some distance below the bottom bar of the front of the grate. A hollow segmental hopper which extends in width from side to side of the grate, is mounted on a horizontal spindle, so that its under surface slides on the curved portion from the grate back. A plate, fitting the interior of the hopper and similarly hinged, is used for forcing the fuel into the combustion chamber, suitable hand or treadle levers being employed for swinging the plate and hopper in any desired position.

5,054.—WATER-CLOSETS: *T. Claughton and others.*—A basin is made with a flange round its upper edge and rests by this means upon the smooth sliding surfaces formed on the top of two side supports which are attached to the floor. The basin is capable of being moved and clamped in any desired position. A lead or other trap is suspended at the outlet of the basin, so that its weight is borne by the latter, a ring with lugs and suitable bolts being employed to grip the two together.

12,808.—WINDOWS: *W. M'Intosh.*—The sashes have sliding hinges attached, which run in metal guides fixed at

COMPETITIONS, CONTRACTS, AND PUBLIC APPOINTMENTS.

COMPETITIONS.

Nature of Work.	By whom Advertised.	Premiums.	Designs to be delivered.
*Schools at Llandrindod Wells	Radnorshire County Governing Body	.....	Mar. 12
*Designs for Schools	Llanidloes Intermediate Schools	10l. 10s.	April 13

CONTRACTS.

Nature of Work or Materials.	By whom Required.	Forms of Tender, &c. Supplied by	Tenders to be delivered.
Street Works (various)	Bootle (Lancs) Corp.	Borough Engineer	Mar. 2
*Station at Evesham	G. W. R. Co.	The Engineer, Wolverhampton Station	Mar. 3
*Goods Yard, &c.	do.	The Engineer, Plymouth Station	do.
Pipe Sewers	Bowden (Cheshire) U.D.C.	J. Newton & Son, 17, Cooper-st. Manchester	do.
Sewers, near Stockport	Disley R.D.C.	H. Bancroft, C.E. 88, Mosley-street, Manchester	do.
Additions to House at Cemetery	Cardiff Burial Board	W. Harpur, C.E. Boro' Eng.	do.
Administrative Block and Homes, Goddard Hall Estate	Sheffield Union	C. J. Innocent, Archt. 17, George-street, Sheffield	do.
Five Houses, Batley Carr, Yorks	.....	B. Watson, Archt. Bradford-road, Batley	do.
Enlargement of House, Burley-in-Wharfedale	.....	Milnes & France, Archts. 99, Swan Arcade, Bradford	do.
Four Houses, &c. Park-road, Barnsley	.....	H. Crawshaw, Archt 13, Regent-street, Barnsley	Mar. 4
Laundry, &c. at Workhouse	Waterford Union	John Mackey, Clerk, Guardians' Offices	do.
School, Ynysboeth, Wales	Llanwonno Sch. Bd.	A. P. Evans, Archt. Post Office-chmbrs, Pontypridd	do.
Street Works, Adderley Green, &c.	Cheadle R.D.C.	F. T. Inskip, Surv. Brook House, Cheadle, Staffs.	do.
Granite Road Metal, &c.	Daventry R.D.C.	W. Willoughby, Jun. Clerk, Daventry	do.
Schools, Chorley New-road	Horwich (Lancs) Sch. Board	E. W. Dyson, Archt. 17, Lee-lane, Horwich	do.
*Roadmaking and Paving	Hammersmith Vestry	H. Mair, 57, Fulham Palace-road, W.	do.
Granite or Quartzite	Bournemouth Corp.	F. W. Lacey, Boro' Surv.	Mar. 5
Four Houses, Victoria-terrace, Meltham	.....	Wm. Carter, Archt. Station-street, Meltham	do-
House, Knowle-road, Mirfield, Yorks	.....	E. C. Brooke, Archt. 6, Huddersfield-road, Brighouse, Leeds	do.
*Watering of Streets	St. Marylebone Vestry	Court House	do.
Congregational Chapel, Woodsley-road, Leeds	.....	G. F. Danby, Archt. 46, Gt. George-st. Leeds	Mar. 6
Road Material, Welsh Granite, &c. Castleton, Lancs.	.....	R. J. Wheater, Surv. Council Offices, Castleton, Manchester	do.
Villa, Brown Foot Gate-lane, Halifax	.....	G. Buckley & Sons, Archt. Tower-chambers, Halifax	do.
Main Sewers	Slaithwaite (Yorks) U.D.C.	Abbey & Hanson, C.E. 20, Ramsden-rd, Huddersfield	do.
*Goods Shed, Chesterfield	M. R. Co.	Co.'s Architect, Cavendish House, Derby	do.
*Painting	do.	J. A. McDonald, M. R. Offices, Derby	do.
Reservoir and Pumping Station	Ashborne U.D.C.	W. H. Radford, C.E. Angelrow, Nottingham	Mar. 7
Road Works	Bradford - on - Avon U.D.C.	H. A. Adye, Archt. Town Hall-chambers, Bradford, Wilts	do.
Whinstone	East Riding C.C.	A. Beaumont, Coun. Surv. Beverley, Yorks	do.
Waterworks	Narberth (Wales) R.D.C.	F. Beesley, Engineer, 11 Victoria-st. Westminster	do.
Villa, Abbey-road, Llangollen	.....	J. W. Hughes, Dee Hurst, Llangollen	do.
Chapel, School, and House, Farnhill, Kildwick, Yorks	.....	Judson & Moore, Archt. Cavendish-st. Keighley	Mar. 9
Schools, St. Mary's Cross Bank, Batley	Rev. C. Gordon	J. W. Burrows, Archt. Birstal, Yorks.	do.
Additions to Asylum, Devizes	Wilts C.C.	C. S. Adye, County Offices, Trowbridge	do.
*Works and Materials	Rotherhithe Vestry	The Clerk, Vestry Hall, Lower-road, Rotherhithe	do.
*Additions to Asylum	Wilts County Asylum	County Offices, Trowbridge	do.

CONTRACTS—*Continued.*

Nature of Work or Materials.	By whom Required.	Forms of Tender, &c. Supplied by	Tenders to be delivered.
*Paving with Granite Setts	Southend-on-Sea Corp.	Boro' Surveyor, Clarence-road, Southend	Mar. 9
*Kerbing, Tar Paving, &c.	Lewisham Bd. of Wks.	Surveyor's Dept. Board of Works Offices	Mar. 10
*Construction of Subway	Burnley Corp.	Borough Surveyor	do.
*Wood Paving	Shoreditch Vestry	T. R. Roscoe, Town Hall	do.
*Works and Materials	Lewisham Bd. of W.	Board of Works Offices, Catford, S.E.	do.
*Sewer Work	Shoreditch Vestry	T. R. Roscoe, Town Hall, Old-street, E.C.	do.
Stoneware Sewer Pipes	Bath Corporation	City Surv. Guildhall, Bath	do.
*Works and Materials	Fulham Vestry	Town Hall	Mar. 11
Farmhouse, Norton, Norfolk	H. N. Bacon	A. Pells, Archt. Beccles	do.
Road Stone	Bridgwater Corp.	Borough Surveyor	do.
Additions, &c. to School	Painswick (Glos.) Sch. Bd.	W. H. C. Fisher, Archt. 6, Rowcroft, Stroud	do.
*Conan-street and Gastein-rd. Fulham	Fulham Vestry	Surveyor, Town Hall, Walham Green, S.W.	do.
*Additions, Kent County Lunatic Asylum	Kent County Asylums Committee	W. J. Jennings, 4, St. Margaret-st. Canterbury	do.
*Providing and Fixing Lavatory Basins	Islington Guardians	W. Smith, 65, Chancery-lane, W.C.	Mar. 12
Schools, Burford-road, Chipping Norton	National School Managers	F. W. Schofield, Chapel House, Chipping Norton	Mar. 13
*Making-up Roads	Met. Asylums Board	T. W. Aldwinckle, 1, Victoria-st. Westminster	do.
Road and Bridge	Abertillery (Mon.) U.D.C.	J. McBean, Engineer, King-street, Abertillery	Mar. 14
Sewerage Works, Cambs.	Chesterton R.D.C.	J. T. Wood, C.E. 3, Cook-street, Liverpool	do.
Cottage Hospital, &c. Builth, Wales	.....	Telfer Smith, Archt. Builth	Mar. 16
Market, Fire Engine Station, &c.	Leek (Staffs.) U.D.C.	J. T. Brealey, Archt. 1, Stockwell-street, Leek	do.
*Sea Wall and Esplanade	Hove U.D.C.	Town Surveyor, Hove	Mar. 17
*Construction of Main Drainage	Elland U.D.C.	M. Paterson, C.E. 335, Manor-row, Bradford	do.
*Construction of Filter Beds, Gauge House, &c.	Stockton & Middlesbrough Water Bd.	J. Mansergh, 5, Victoria-street, Westminster	Mar. 18
*Repairs to Steam Road Rollers	Battersea Vestry	J. T. Pilditch, Municipal-buildings, Lavender Hill	do.
Fire Engine Station, Priory-road, Halton	Hastings Corporation	P. H. Palmer, C.E. Boro' Engineer	Mar. 24
*Construction of New Museum for Egyptian Antiquities	Egyptian Government	Offices of the "Service Administratif"	April 13
*Construction of Arabic Museum and Khedivial Library, Cairo	do.	do.	May 2
100 Cottages, New Hirst, Durham	Ashington Coal Co.	Manager, Colliery Office, Ashington	No date
Two Houses, Queen-street, Ashton-under-Lyne	.....	T. George & Son, Archts. Old-sq. Ashton-under-Lyne	do.
Offices, Lee-street, Bacup	Rossendale Un. Gas Co.	Smith & Cross, Archts. Town Hall Chambers, Rochdale	do.
House, Steeton, Yorks.	.....	Jno. Haggas, Archt. North-street, Keighley	do?
Ten Workmen's Cottages, Cwmtillery, Mon.	.....	E. A. Lansdowne, Archt. Metropolitan Bank Chambers, Newport, Mon.	do.
Additions to Wesleyan Chapel, Cadoxton, Cardiff	.....	Jones, Richards, & Budgen, Archts. 18, St. Mary-st. Cardiff	do.
Conservative Club-house, Hetton-le-Hole, Durham	.....	Frank Caws, Archt. 99, Fawcett-st. Sunderland	do.
Two Shops and Houses, Tong-street, Bradford	.....	Fred. Moore, Archt, 40, Sunbridge-rd. Bradford	do?
Five Shops, Stables, &c. Carlisle-road, Bradford	.....	do.	do.
School, Blackwell-road, Carlisle	.....	G. Dale Oliver, Architect, Carlisle	do.
Two Houses and Shops, Lowertown, Oxenhope, Yorks.	.....	Jno. Haggas, Archt. North-street, Keighley	do.

PUBLIC APPOINTMENTS.

Nature of Appointment.	By whom Advertised.	Salary.	Applications to be in
*Surveyor, Inspector, and Gas Examiner, Jointly	Broadstairs and St. Peters, U.D.C.	95l. 65l. and 5l. respectively	Mar. 9
*Engineering Assistant	Pokesdown U.D.C.	1l. 10s. per week	do.
*Clerk of Works	Berkhampsted R.D.C.	3l. 3s. per week	Mar. 7
*Clerk of Works	Watford U.D.C.	.....	Mar. 9
*Surveyor	Met. Asylums Board	400l. per ann. commencing	Mar. 13

Those marked with an asterisk (*) are advertised in this Number. Competitions, p. iv. Contracts, pp. iv., vi., viii., x., & xxi. Public Appointments, p. xix.

one side of the frame. On the opposite side of the frame the parting and inner beads are arranged so that the sashes may be swung into the room. A single weight for raising and lowering is hung on the hinged side. The lower sash is kept in position by a spring lock, and is also attached to the upper sash by a thumb-screw. In order to permit the upper sash to be opened a drop-pit is provided into which the lower sash may sink sufficiently to enable the meeting rails of the sashes to clear each other.

12,855.—WINDOWS: *M. Butcher and another.*—For holding sliding windows in any desired position, an elastic roller is fitted in a metal frame recessed in the outer edge of each side of the sash. The rollers project sufficiently beyond the sash to ensure enough compression between sash and frame for the purpose aforesaid.

17,886.—DRAIN TRAP: *T. Kemp.*—An intercepting trap formed of glazed stoneware, having two vertical inspection openings and a U-shaped dip or seal.

24,076.—CHIMNEY-POT: *J. Duckett & Son.*—A chimney-pot with one or more grooved rings or louvres is arranged with overlapping projections or drip ledges for preventing the entrance of rain into the smoke flue.

NEW APPLICATIONS FOR LETTERS PATENT.

FEBRUARY 10.—2,960, J. Lumsden, Fastening Cords, Ropes, or Chains to Window-sashes.—2,961, A. Smith, Band Sawing Machines, &c.—2,979, W. Reading, Grating for Intercepting Traps.—2,994 and 2,995, M. Foster, Chimney or Ventilator Tops.—3,004, W. Le Roy, Preventing Bursting of Water-pipes by Freezing.—3,014, W. Shoosmith, Joints or Unions for Pipes, &c.—3,020, C. Upright, Chimney-cowls, also applicable to Ventilators.—3,029, C. Husk, Nail and Washer for Corrugated Roofing.—3,033, The Pneumatic Painting Machine Corporation, Ltd., and H. Cleaver, Appliances for Spraying Oil, Paint, Varnish, &c,; upon Surfaces.

FEBRUARY 11.—3,049, E. Codling, Trap for Drains, Sewers, &c.—3,085, J. Hyett, Plumb Bobs and Lines.—3,110, C. Maitland and W. Thomas, Window-sash Fasteners.—3,128, W. Smith, Hinge.

FEBRUARY 12.—3,153, T. Dove and T. Jamieson, Ventilators.—3,155, J. Green and W. Oates, Waste-water Latrine Closets, and flushing same.

FEBRUARY 13.—3,232, J. Hanson, Constructing Fireproof Floors, Flats, Partitions, and Walls.—3,237, F. Hodgess, Slop-blocks for Sink-pipes, &c.—3,244, W. Cassels, Lavatories.—3,267, D. Hursh, Water-closets.—3,281, R. Belshaw, Slide-rules.—3,289, J. Stoddart, Springless Lever Lock.—3,297, F. Trier, Machinery for Working Stone, &c.

FEBRUARY 14.—3,351, G. Viggars, Bricks and Tiles.—3,373, G. Ferrington, Tiles for Lining Walls, Ceilings, &c., and Machinery for manufacturing same, as well as in the mode and means of mounting.—3,374, J. Booth, Fireproof Doors, and Apparatus for automatically operating or closing, and protecting same in case of fire.—3,400, H. McGovern, Grates.

FEBRUARY 15.—3,438, W. Peyton, Stove or Fire-grate.—3,444, E. Klinkmüller, Roofing Buildings.—3,451, W. Ludlow, Mitre Cramp.—3,455, A. Clifford, Syphon for Flushing Cisterns.—3,466, J. Duckett & Son, Limited, and J. Bullock, Machinery used in the Casting of Jointing Material on Stoneware or other Pipes.—3,482, W. Lack and W. Shrive, Tangs and Shoulders of Chisels and other Cutting or Edged Tools.—3,499, H. Allder, Window-sash Fastener.

PROVISIONAL SPECIFICATIONS ACCEPTED.

23,642, J. Berry and G. Beardsall, Brick Press.—762, T. Goodwin, Drain Stoppage Indicator.—1,081, The Whitecross Company, Limited, Improved Nail.—1,094, G. Cartland and J. Ross, Heating Stoves.—1,626, W. Horsfall and R. Berry, Floors, Platforms, &c.—1,680, W. Johnson, Firegrates.—1,723, R. Fuller, Ventilator.—1,794, J. Ormrod, Kilns for making Bricks, &c.—1,833, A. Jones, trading as Messenger & Sons and J. Day, jun., Chandeliers, &c.—1,835, K. McKenzie, Cowls for Chimneys or Shafts.—1,990, H. Hutchinson and J. Green, Sliding Windows.—2,157, W. Thomson, Window-sashes.—2,202, J. Berry and others, Brick-making or like Presses.

COMPLETE SPECIFICATIONS ACCEPTED.

Open to opposition for two months.

7,382, W. Marchland, Water Closets.—7,425, H. Simmonds and J. Delaney, Kilns or Furnaces for burning lime, &c.—7,479, F. Bennett, Devices to facilitate building Operations.—10,834, E. Traies, Waste-water Preventers and Flushing Tanks.

SOME RECENT SALES OF PROPERTY

ESTATE EXCHANGE REPORT.

Feb. 11.—By W. HACKETT (at Birmingham).

Rednal, Warwick.—"Nimming's Farm," 15 a. 2 r. 21 p., f. £1,220

Quintin, Warwick.—"Broomhills," and 12 a., f. 750

Feb. 12.—By R. SCARBOROUGH & SON (at West Vale).

Halifax, Yorks.—"Barkisland Hall Farm," 37 a. 3 r. 25 p., f. 2,000

By THOMPSON, RIPPON, & Co. (at Ottery).

Ottery St. Mary, Devon.—"The Grove Farm," 17 a. 0 r. 8 p., f. 575

Feb. 13.—By W. ARNOTT & SON (at Woodbridge).

Charsfield, Suffolk.—Farmhouse and 75 a. 3 r. 27 p., f. and c. 465

By FRANKLIN & SON (at Bishop's Stortford).

Stanstead, Essex.—Silver-st., &c., eight cottages, f., r. 37l. 10s. 630

Woodfield, two f. residences, r. 70l. 1,120

By DILLEY & SON (at Ely).

Sutton, Cambs.—Enclosures of land and three cottages, 21 a. 2 r. 37 p., c. 335

Witcham, Cambs.—Two enclosures of land, 14 a. 1 r. 31 p., f. and c. 205

Mepal, Cambs.—Three enclosures of land, 44 a. 3 r. 6 p., f. and c. 735

Feb. 14.—By J. HIBBARD & SONS.

Stoke Newington.—161, Dynevor-rd., u.t. 79 yrs., g.r. 6l. 240

Holloway.—4 and 6, Milton-grove, u.t. 65 yrs., g.r. 12l. 220

17, Hampden-rd., u.t. 66½ yrs., g.r. 1l. 185

By P. W. SLARK & Co.

Leyton.—Knott's Green-rd., &c., a block of building land, f. 1,005

Reversion to one-fourth of freehold and leasehold ground-rents, amounting to 211l. 13s. 8½d. per annum 630

Feb. 17.—By WHITTLE & ATTENBOROUGH (at Thrussington).

Thrussington, Leicestershire.—"Wreake House" and 6 acres, f. 800

House and enclosures of land, 4 a. 2r. 0 p., f. 405

By DICKINSON & RIGGALL (at Spilsby).

East Kirkby, Linc.—Two enclosures of land, 14 a. 3 r. 32 p., f. 460

Feb. 18.—By VENTOM, BULL & COOPER.
Bloomsbury.—8, Devonshire-st., f., r. 120*l.* 18s. ... 1,020
By C. W. DAVIES.
Islington.—168, New North-rd., u.t. 30 yrs., g.r. 6*l.* 6s., e.r. 45*l.* ... 250
57, Oakley-rd., u.t. 45 yrs., g.r. 5*l.* 10s., r. 46*l.*... 450
By DEBENHAM, TEWSON, FARMER & BRIDGEWATER.
City of London.—16, Poultry, f., r. 600*l.*, area 670 ft. ... 18,300
37 and 38, King William-st., f., area 2,200 ft., r. 900*l.* ... 18,050
Camden-rd.—2, Middleton Mews, u.t. 51 yrs., g.r. nil ... 900
Haverstock Hill.—No. 136, u.t. 43 yrs., g.r. 14*l.*... 780
By C. L. LILLEY.
Woodford.—George-lane, "Luton House," f., r. 55*l.* 1,170
By BRADSHAW BROWN.
Poplar.—Suffolk-st., &c., l.g.r. 29*l.*, u.t. 57½ yrs., g.r. 10*l.* ... 330
6 and 7, Sussex-st., and l.g.r. 24*l.* 15s., u.t. 57½ yrs., g.r. 12*l.* ... 700
23, Woodstock-rd., u.t. 47½ yrs., g.r. 4*l.* 10s., r. 30*l.* ... 325
108 and 110, Augusta-st., u.t. 43½ yrs., g.r. 7*l.* ... 230
8, Market-st., u.t. 32½ yrs., g.r. 2*l.* 15s. ... 135
66, 68, 76, and 78, Upper North-st., u.t. 32½ yrs., g.r. 12*l.* ... 660
Stepney.—21, Smith-st., u.t. 17½ yrs., g.r. 1*l.*, r. 28*l.* ... 210
105 and 107, Jamaica-st., u.t. 13 yrs., g.r. 8*l.*, r. 53*l.* ... 300
By W. M. OGDEN & SONS (at Wimbledon).
Wimbledon.—Lambton-rd., a block of bldg. land, f. ... 325
By W. O. JONES (at Preston).
Goosnargh, Lancs.—"Latus Hall Estate," 115 a. 0 r. 17 p., f. ... 4,650
Feb. 19.—By DOUGLAS YOUNG.
Clapham.—41, Sandmere-rd., u.t. 84 yrs., g.r. 7*l.* 10s., r. 42*l.* ... 330
Wandsworth.—Heslop-rd., "Roseland," f., r. 34*l.* ... 510
By E. & S. SMITH.
Barnsbury.—92, John-st., u.t. 48 yrs., g.r. 4*l.* 4s., r. 57*l.* 10s. ... 400
New Southgate.—5 and 6, Melton Villas, u.t. 61 yrs., g.r. 10*l.*, r. 49*l.* 10s. ... 265
By MOORE & TEMPLE (at Colchester).
Colchester, Essex.—Head-st., a freehold residence, r. 125*l.* ... 1,900
By A. DOWELL (at Edinburgh).
Mid Calder, &c., Edinburgh.—Grange and Howatstone Farms, 483 acres ... 12,760
By J. G. KILLINGWORTH & SON (at Boston).
Wyberton, Lincs.—"Vine Nursery," 41 a. 0 r. 38 p., f. and c. ... 2,250
Feb. 20.—By BOYTON & PEGRAM.
Fulham.—10, Barclay-rd., u.t. 63½ yrs., g.r. 7*l.* 10s., r. 50*l.* ... 450
By FIELD & SONS.
Lambeth.—13, 15, and 16, Wootton-st., f., r. 106*l.* 12s. ... 930
Wootton-st., f.g.r. 9*l.* 10s., reversion in 16½ yrs. ... 310
Bermondsey.—169, Jamaica-rd., u.t. 50½ yrs., g.r. 7*l.*, r. 47*l.* ... 420
By CHESTERTON & SONS.
Brook Green.—12, Girdler's-rd., u.t. 69¾ yrs., g.r. 4*l.* ... 790
By NEWBON & CO.
Hampstead-rd.—223, Stanhope-st., u.t. 43 yrs., g.r. 6*l.*, r. 54*l.* ... 600
Islington.—41, Gibson-sq., u.t. 30½ yrs., g.r. 8*l.*, e.r. 50*l.* ... 300
70, 72, and 74, Queen's Head-st., u.t. 40½ yrs., g.r. 15*l.* 15s., r. 98*l.* ... 710
Highbury.—182, Highbury New Pk., u.t. 53½ yrs., g.r. 15*l.*, e.r. 85*l.* ... 485
65, Balfour-rd., u.t. 53½ yrs., g.r. 6*l.* 6s., e.r. 50*l.* 420

[*Contractions used in these Lists.*—F.g.r. for freehold ground-rent; l.g.r. for leasehold ground-rent; i.g.r. for improved ground-rent; g.r. for ground-rent, r. for rent; f. for freehold; c. for copyhold; l. for leasehold; e.r. for estimated rental; u.t. for unexpired term; p.a. for per annum; yrs. for years; st. for street; rd. for road; sq. for square; pl. for place; ter. for terrace; cres. for crescent; yd. for yard, &c.

PRICES CURRENT OF MATERIALS.

TIMBER.		
Greenheart, B.G.		
ton	8/0/0	0/0/0
Teak, E.I. ..load	10/0/0	16/0/0
Sequoia, U.S. ft. cu	1/10	2/0
Ash, Canada load	3/5/0	4/10/0
Birch, do.	2/15/0	4/15/0
Elm, do.	4/0/0	5/5/0
Fir, Dantsic, &c.	2/0/0	3/10/0
Oak, do.	2/15/0	4/15/0
Canada	6/10/0	8/0/0
Pine, Canada red	0/0/0	0/0/0
Do. Yellow	2/15/0	5/0/0
Lath, Dantsic, fath	4/10/0	5/10/0
St. Petersburg..	5/0/0	6/10/0
Wainscot, Riga, &c., log	2/15/0	5/0/0
Odessa, crown...	2/15/0	5/0/0
Deals, Finland		
and & 1st std 100	7/0/0	8/10/0
Do. 4th & 3rd ..	7/0/0	8/0/0
Do. Riga	7/0/0	8/0/0
St. Petersburg, 1st yellow ...	9/10/0	12/0/0
Do. 2nd yellow	7/10/0	9/0/0
Do. white	8/0/0	9/10/0
Swedish	7/0/0	15/10/0
White Sea.....	7/15/0	14/15/0
Canada, Pine 1st	21/0/0	25/0/0
Do. do. 2nd....	16/0/0	17/0/0
Do. do. 3rd, &c.	8/0/0	10/0/0
Do. Spruce, 1st..	9/0/0	10/10/0
Do. do. 3rd and 2nd	6/15/0	7/10/0
New Brunswick	6/0/0	7/0/0
Battens, all kinds	5/0/0	20/0/0
Flooring boards,		
sq., 1 in. prep. 1st.....	0/9/6	0/14/6
Do. 2nd	0/6/6	0/11/6
Other qualities—	0/4/6	0/7/6
Cedar, Cuba ..ft.	/4	/4½
Honduras, &c.	/3½	/4½
Mahogany, Cuba	/3½	/6
St. Domingo,		
cargo av.	/3½	1/0
Mexican do. do.	/4	/4½
Tobasco do. do.	/4½	/6
Honduras do...	/4½	/6
Box, Turkey ton	4/0/0	15/0/0
Rose, Rio	7/0/0	16/0/0
Bahia	6/0/0	15/0/0
Satin, St. Do.		
sing	0/1/7	0/1/0

TIMBER *continued*.		
Satin, Porto Rico	0/0/7	0/1/6
Walnut, Italian....	0/0/3	0/0/7
METALS		
Iron—Pig, in Scotland .....ton	2/7/2	0/0/0
Bar, Welsh, in London	5/12/6	5/15/0
Do. do. at works in Wales.....	5/2/6	5/5/0
Do. Staffordshire, in London.....	6/0/0	6/10/0
COPPER—British		
cake and ingot	49/0/0	49/10/0
Best selected ..	50/10/0	51/0/0
Sheets, strong..	56/10/0	0/0/0
Chili bars	45/15/0	46/0/0
YELLOW METAL	0/0/4½	0/0/4¾
LEAD—Pig,		
Spanish ....ton	11/7/6	0/0/0
English com. brands	11/8/9	11/10/0
Sheet, English, 6 lbs. per sq. ft. and upwards ..	12/10/0	0/0/0
Pipe	12/10/0	0/0/0
ZINC—English sheet .....ton	18/5/0	18/10/0
Vieille Montagne	18/15/0	0/0/0
TIN—Straits.....	60/15/0	61/5/0
Australian.....	61/7/6	61/17/6
English Ingots.	64/0/0	64/10/0
Banca.....	61/5/0	61/10/0
Billiton	60/15/0	61/0/0
OILS.		
Linseed .....ton	19/0/0	19/12/6
Cocoanut, Cochin	26/10/0	0/0/0
Do. Ceylon	22/10/0	22/15/0
Palm, Lagos	22/0/0	0/0/0
Rapeseed, English pale.....	24/10/0	25/10/0
Do. brown	23/0/0	23/15/0
Cottonseed ref. .	16/10/0	17/0/0
Oleine.....	19/10/0	20/15/0
Lubricating, U.S.	6/6/0	9/6/0
Do. black	4/9/0	6/6/0
TAR—Stockholm barrel	1/0/0	0/0/0
Archangel.....	0/14/6	0/15/0

TENDERS.

[Communications for insertion under this heading should be addressed to "The Editor," and must reach us *not later than* 10 *a.m. on Thursdays*. N.B.—We cannot publish Tenders unless authenticated by the name and address of the sender: and we cannot publish lists in which the accepted Tender is below £100, unless in some exceptional cases and for special reasons.]

BARNET.—For the erection of new house at Warwick-road, New Barnet. Mr. F. D. Thomson, architect, Woodside Park:—

Brown & Sweetland.....	£963	Smith.....	£827
Pointing	912	Wheeler & Peake, North Finchley *.....	800
Briers.....	855		

* Accepted.

BARNSLEY.—Accepted for the erection of school buildings, Beckett-street, Eldon-street North, for the School Board. Messrs. Senior & Clegg, architects, 15, Regent-street, Barnsley:—

Masonry—Aaron Moore, Barnsley	£2,399 0
Joinery.—W. Hammerton's Exors., Worsbro' Dale, near Barnsley	852 0
Plumbing.—Snowden & Son, Barnsley	199 10
Plastering.—E. Fleming, Barnsley	78 0
Slating.—E. Fleming, Barnsley	186 0
Painting.—E. R. Fletcher, Barnsley	90 19
Heating Apparatus.—S. Rushforth, Barnsley	82 0

BECKENHAM.—For building new public rooms and sundry alterations and repairs to the "Greyhound" public-house, Beckenham, for Whitbread & Co., Ltd. Mr. Albert L. Guy, architect and surveyor, Bedford-row House, W.C.:—

Simes & Duncan	£695	Kennard Bros.	£580
Graham	690	T. Knight, Sidcup *.....	559
Jerrard	583		

* Accepted.

BERKHAMSTED.—For sewerage and sewage disposal, Berkhamsted. Mr. James Lemon (Messrs. Lemon & Blizard), engineer, 9, Victoria-street, Westminster:—

	Contract A.*	Contract B.
Thos. Free & Son	£7,970	£6,000
C. G. Raynor.....	7,650	5,650
Geo. Taylor	7,569	4,217
Thos. Adams.....	6,800	4,800
John Jackson.....	6,700	4,400
Geo. Bell.....	6,253	4,356
Siddons & Freeman	5,900	3,900
B. Cooke & Co.	5,743	3,732
W. Cunliffe.....	5,501	3 895
J. Bentley	5,358	3,375

* Engineer's estimate, £6,000

BLAIRGOWRIE (N.B.).—For the formation of sewers, Perth-road and West George-street, for the Police Commissioners of the Burgh of Blairgowrie. Mr. Lake Falconer, Burgh Surveyor, 7, George-street, Blairgowrie. Quantities by Surveyor:—

Peter Garrity £313 0 0		Robert Band & Co.,	
James McLeish.....	300 19 10	Dura-street,	
William Hodge †	262 14 0	Dundee * £270 0 0	

* Accepted. † Withdrawn.

BRISTOL.—For making new road, &c., Easton and Gordano, for the Long Ashton Highway Board. Mr. J. Hawkins, Surveyor, 167, Coronation-road, Bristol:—

W. Hurford.....£946 11 6		Lloyd & Son £693 0 0	
Thomas & Webb	852 0 0	M. Lovell.....	674 12 4
Geo. Biss & Son	715 0 0	H. Weeks, Wraxall, near Bristol *	599 0 0
John Child	704 0 0		

* Accepted.

BURTON-ON-TRENT.—Accepted for the execution of sewerage works (Contract No. 8) for the Corporation. Mr. J. E. Swindlehurst, C.E., Borough Surveyor, Burton-on-Trent:—

George Hodges, Byrnley-street, Burton-on-Trent	£5,667 8 7

CARDIFF.—Accepted for the erection of the annexe to the Exhibition Buildings, Cardiff, for Spillers Nephews Biscuit Co., Ltd. Messrs. Veall & Sant, architects:—

W. Symonds & Co.	£482

CATFORD.—For sundry repairs and sanitary work at the Hatcliffe Almshouses, Catford, for the Trustees of the Lewisham Parochial Charities. Mr. Albert L. Guy, architect and surveyor, Bedford-row House, W.C.:—

Nicholls	£359	Mills	£275
Rose	329	B. Weatherley & Sons, Catford*	248
Bennett.....	309		

* Accepted.

CATFORD.—Accepted for work in underpinning "Riverview," Catford, for Mr. E. Silverthorne. Mr. Albert L. Guy, architect and surveyor, Bedford-row House, W.C.:—

G. Nicolls, Catford	£260

CATFORD.—For new shop front and sundry alterations to 161, Rushey Green, Catford, S.E., for Messrs. Whitbread & Co., Ltd. Mr. Albert L. Guy, architect and surveyor, Bedford-row House, W.C.:—

Kennard Bros. £174 0		B. Weatherley & Son,	
Jerrard	173 0	Catford*	£140 0
G. Simmonds & Son	141 5		

* Accepted.

DOVER.—For the execution of wood-paving works, High-street, for the Town Council:—

	For laying, at per sq. yd. s. d.	For supplying wood blocks, at per 100. £ s. d.
H. Richardson.....	—	1 4 9
The Acme Wood Flooring Co., Ltd. *	11 0	—
Palfreman, Foster, & Co.	—	1 1 9 / 1 1 6
Burt, Boulton, & Hayward	—	1 1 3
W. Griffiths	11 0	19 0
Hayward & Paramor	13 6	1 1 2
J. Mowlem & Co.	13 7	1 2 9
The Improved Wood Pavement Co., Ltd.....	11 3	19 3

* Accepted.

LONDON.—For additions to laundry, Fulham. Messrs. Geo. Elkington & Son, architects, 95, Cannon-street, E.C.:—

Roffey.....	£1,037	Smith & Sons	£991
Carmichael	1,020	Battley, Sons, & Holness ..	987

CHISLEHURST (Kent).—For new front, and various alterations and repairs, and rebuilding stables at the "Crown" public-house, Chislehurst, Kent, for Whitbread & Co., Ltd. Mr. Albert L. Guy, architect and surveyor, Bedford-row House, W.C.:—

Pritchard & Renwick £1,730		J. Otway, Belmont works,	
Geo. Simmonds & Son....	1,596	Chislehurst *	£1,422
T. Knight.....	1,529		

* Accepted.

EASTBOURNE.—For works at No. 4, Devonshire-place, for Mr. W. Ryle. Mr. William Cooper, architect, 21, Havelock-road, Hastings:—

For Drainage Work.

S. Hart	£110 0	M. Martin*	£99 10
J. Peerless.....	105 0		

* Accepted.

For Repairs.

S. Hart	£145 10	J. Peerless*	£95 0 0
M. Martin	134 10		

* Accepted.

[All of Eastbourne.]

GREAT ELLINGHAM (Norfolk).—For the erection of school buildings, house, &c., for the Great Ellingham School Board. Mr. H. J. Green, architect, 31, Castle Meadow. Quantities by the architect:—

Newson & Sons £3,167 10 3		E. J. Smith £2,685 10 0	
Joseph Springall & Son	2,689 0 0	Solden Hipwell....	2 683 15 0
E. L. Semmence ..	2,980 0 0	Wm. Hubbard	2,625 9 10
W. H. Brown	2,877 0 0	J. Youngs & Son ..	2,577 0 0
Collins & Barber ..	2,850 0 0	R. W. Riches	2,551 15 9
Bardell Bros.	2,830 0 0	T. H. Blyth	2,527 9 6
Adcock & Son.....	2,794 0 0	Plumb & Browne, Norwich *	2,490 15 11

[Architect's stimate, £2,593 18s. 6d.]
Accepted.

HASTINGS.—For alterations and repairs to No. 10, Trinity-street, for Mr. J. Hooper. Mr. William Cooper, architect, 21, Havelock-road, Hastings:—

J. C. Kenwood £157 0		Midmer Bros., Hastings *.....	£127 10
Padgham & Hutchinson ..	138 0		

* Accepted.

HULL.—Accepted for new school buildings, Newland, Hull, for the Port of Hull Society Sailors' Orphans Homes. Mr. W. H. Bingley, architect, Hull. Quantities by architect:—

Bricklaying.—Robinson & Johnson.....	£1,145 1 8
Joinery.—D. Sayner	645 0 0
Masonry.—G. Porter	290 0 0
Slating.—T. Wilde & Sons	198 0 0
Plumbing.—J. Beal.....	133 0 0
Ironfounding.—Young & Peck	136 10 0
Painting.—H. Hilken.....	29 6 3
Total	2,577 4 11
Highest full tender	£2,826 0 0
Lowest ,, ,, ...	2,774 14 8

LEOMINSTER.—Accepted for the erection of a villa residence, for Mrs. Bufton. Mr. Ernest G. Davies, architect, 6, St. John-street, Hereford:—

Turford & Southward, Ludlow.....	£400

LIZARD.—For additions to hotel, "The Lizard," Cornwall. Mr. S. Hill, architect, Redruth:—

White & Thomas	£930	Tiddy & Hill	£896
Masonry.—Mitchell, Leedstown, Hayle.....			£845
Carpentry.—Moyle, Chacewater, Scorrier R.S.O.			

* Accepted.

LONDON.—For the execution of road works, paving, &c., at High-street and Stoke Newington-road, for the Stoke Newington Vestry. Mr. S. E. Burgess, C.E., 126, Church-street, Stoke Newington, N.:—

G. J. Anderson £2,360 13 9		Wm. Wadey £1,934 12 6	
Jno. Mowlem & Co. 2,291 7 6		Improved Wood	
Thos. Adams	2,198 8 9	Paving Co., Queen	
Wm. Griffiths	2,130 0 10	Victoria-street* ..	1,934 12 6

[Surveyor's estimate, £1,592 12s. 4d.]
* Accepted.

LONDON.—For wood-paving works at Green Lanes, Stoke Newington, for the Vestry. Mr. S. E. Burgess, C.E., surveyor:—

	Creosoted yellow deal.	Jarrah.	Karri.
Thos. Adams	£175 13 9	£175 15 0	£175 15 0
Mowlem & Co.....	134 2 6	161 17 6	161 17 6
Anderson.....	133 7 1	159 11 3	158 15 10
W. Griffiths.....	122 11 3	150 6 3	150 6 3
Improved Wood Paving Co.	115 12 6	148 0 0	148 0 0
W. Wadey, Stoke Newington (accepted)	106 7 6	154 18 9	154 18 9

LONDON.—For the Charlton-road improvement, for the Greenwich Board of Works:—

Fry Bros. £1,826		Mowlem & Co. £1,711	
Griffiths.....	1,798	H. Woodham (accepted)	1,695

LONDON.—For mission hall, &c., Bromehead-street, Commercial-road, E. (in connexion with St. Thomas' Vicarage, Stepney). Mr. George Pearson, architect, 32, Finsbury Pavement, E.C.:—

J. Lidstone & Son.....£1,650		F. & F. J. Wood £1,430	

LONDON.—For the erection of new Baptist Chapel at Woolwich Lower-road, S.E. Mr. G. Baines, architect, 4, Great Winchester-street, E.C.:—

Scotney & Wootten £5,209	0 0	B. E. Nightingale ..£4,104	0 0
F. J. Gorham	4,909 7 10	S. J. Scott.....	4,174 0 0
Balaam Bros.	4,575 0 0	Jerrard & Sons... ..	4,093 0 0
W. Shurmur.....	4,383 0 0	E. Proctor	4,081 2 6
T. D. Leng	4,371 0 0	Battley, Sons, & Holness.....	4,024 0 0
J. & C. Bowyer	4,370 0 0	Lilly & Lilly, Lim.	3,997 0 0
R. A. Lowe	4,328 0 0	West Bros.	3,956 0 0
H. L. Holloway	4,294 0 0	Thos. Barden *	3,955 7 0
T. White & Sons ..	4,230 6 9		
C. Slow	4,194 10 0		

* Accepted.

LONDON.—For the erection of factory at Bermondsey, for Messrs. Chas. Wix & Sons. Mr. J. W. Brooker, architect, 13, Railway-approach, London Bridge, S.E.:—

Battley, Sons, & Holness £5,822 | Edwards & Medway * £5,227	

* Accepted.

LONDON.—For new soap-cutting room at Stratford, for Messrs. T. H. Harris & Sons. Mr. J. W. Brooker, architect:—

Green & Co. £979		C. Hoskings.....£887	
Edwards & Medway	927	Battley, Sons, & Holness*..	847
Larke & Son	894		

* Accepted.

LONDON.—For sewering Birkbeck, Shakespeare, Milton, Tennyson, Marion, Byron, and Victoria-roads, Mill Hill, Headon, Contract No. 17, and making up Hendon Park-row, Contract No. 18, for the Urban District Council of Hendon. Mr. S. S. Grimley, Engineer and Surveyor:—

	Birkbeck-road.	Shake-speare-rd.	Milton-road.	Tennyson-road.	Marion-road.	Byron-road.	Victoria-road.	Total. Contract 17.	Hendon Park-row. Contract 18.
	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
A. T. Catley †.....	250 0 0	157 10 0	133 5 6	135 14 0	87 5 0	94 5 0	170 0 0	1026 16 6	93 7 4
R. Ballard, Limited, Child's Hill, N.W.* ..	256 19 6	149 6 9	130 1 8	131 12 3	101 1 7	103 14 0	183 4 10	1056 0 7	72 0 11
Jesse Jackson †	252 7 0	150 13 0	130 2 0	132 11 0	104 0 9	113 2 0	185 16 0	1068 1 9	75 5 3
J. Allen & Son †	261 13 5	154 19 1	132 8 4	134 7 8	98 14 11	101 4 6	184 18 10	1068 6 9	104 19 3
E. W. Hollingsworth ..	304 0 0	184 0 0	157 0 0	163 0 0	127 0 0	124 0 0	216 0 0	1274 0 0	131 0 0
Thos. Adams	317 15 0	196 2 0	167 14 0	169 17 0	133 18 0	130 18 0	239 8 0	1355 12 0	101 2 0
Wm. Lee & Son	353 17 2	208 11 0	182 17 4	185 7 8	148 3 2	144 9 0	261 0 4	1484 6 5	58 5 9
James Dickson †.....	357 6 0	222 10 0	191 0 0	192 1 0	152 4 9	149 0 0	277 0 0	1539 1 9	86 0 0
Engineer's estimate ..	270 18 7	145 1 9	143 7 1	145 14 5	112 12 3	110 0 0	199 0 10	1126 14 11	67 0 0

* Accepted. † Informal.

LONDON.—For alterations to and fitting up offices at No. 40, King-street, Cheapside, E.C. Mr. J. R. Manning, architect, Milk-wood Estate Office, Herne Hill, S.E. :—

Holliday & Greenwood	£2,077	Maple & Co.	£1,967
Battley, Sons, & Holness	2,077	Wallace	1,815

LONDON.—For repairs and alterations at St. Mary's Schools, Massinger-street, Old Kent-road, S.E. Mr. R. T. Browne, architect, 1, Gray's Inn-place, W.C. :—

Arle & Co.*	£970 0	Battley, Sons, & Holness	£797 0
Johnson & Co.	875 0	Simmonds & Son	735 10
Chalkley	815 0	* Accepted.	

LONDON.—For reinstating premises after fire, Mill-street, Dock-head, S.E. Messrs. G. Elkington & Son, architects, 95, Cannon-street, E.C. :—

Holloway Bros.	£1,060	Balaam Bros	£760
H. Wells	1,037	J. Greenwood	743
H. J. Williams	876	Battley, Sons, & Holness *	724
		* Accepted.	

LONDON.—For converting 175-181, Leytonstone-road, E., into shops, with stabling in rear. Messrs. Newman & Jacques, architects, 2, Fen-court, Fenchurch-street, E.C. :—

Gregar & Son	£1 991	Battley, Sons, & Holness	£1,643
Heard & Farrow	1,942	Reed & Son	1,562
Catley	1,753	North Bros.	1,524
Wosking	1,727	Holland*	1,457
		* Accepted.	

LONDON.—Accepted for the erection of new Baptist Chapel, Elderton-road, Bermondsey, S.E. Mr. G. Baines, architect, 4, Great Winchester-street, E.C. :—

Battley, Sons, & Holness £3,777 14

LONDON.—Accepted for partly pulling down and rebuilding and altering workshops for Messrs. Dottridge Bros., East-road, N. :—

John Weibking & Sons £342

LONDON.—For sundry alterations and decoration in Holly Park, Crouch Hill. Mr. Geo. Waymouth, architect :—

Wm. Wells	£105 0	Houghton, Stroud Green*	£98 10
		* Accepted.	

LONDON.—Accepted for rebuilding stables and various repairs and decorations at the "Coach and Horses," High-street, Lewisham, for Messrs. Whitbread & Co., Limited. Mr. Albert L. Guy, architect and surveyor, Bedford-row House, W.C. ; —

B. Weatherley & Son, Lewisham £253

LONDON.—For the construction of Rhyme-road, on the Brook House Estate, Lewisham, for Mr. E. Mac F. Patterson. Mr. Albert L. Guy, surveyor, Bedford-row House, W.C. :—

T. Knight	£880	H. Woodham, Blackheath	
Fry Bros.	788	Hill (accepted)	£565

LONDON.—For the erection of offices and auction room, for Messrs. F. Winder & Co., auctioneers, High-street, Lewisham, S.E. Mr. Albert L. Guy, architect and surveyor, 76a, High-street, Lewisham, S.E. :—

B. Weatherley & Sons	£274 10	Kennard Bros.	£235 0
J. B. Wells	245 0	W. Bennett & Son,	
E. Mills	240 0	Lewisham (accepted)	219

LONDON.—For repairs at 33, Highbury Hill, N., for Mr. R. Buckley. Mr. Edward Brown, architect, Fleur-de-Lys-street, Bishopsgate :—

George Cox	£179 0	Sheffield Bros.	£138 0
Bristow & Eatwell	141 15		

LONDON.—For alterations at "The Waterloo," Barnsbury, for Mr. J. H. Malin. Mr. Edward Brown, architect, Fleur-de-Lys-street, Bishopsgate :—

Beedham	£342	E Lancaster	£318
Wenham	336	Easton	293

Pewterers' Work.

Barley	£89 0	Rogers & Son	£69 10
Grimes & Son	77 0		

LONDON.—For repairs and decorative works to No. 14, Taviton-street, Gordon-square, W.C. Mr. Walter J. Ebbetts, architect and surveyor, Savoy House, 115, Strand, W.C. :—

Verbury & Sons	£415 0	Macey & Son	£298 0
Borrell & Co.	345 0	W. Smith	267 0
Rayment & Son	299 10		

LONDON.—Accepted for alterations and decorations to 39, Bassett-road, Notting Hill :—

Walter & Co. £270

MANCHESTER.—Accepted for the erection of a large block of business premises, Oldham-road, Newton Heath, for the Failsworth Industrial Society. Mr. F. W. Dixon, architect, Guardian Buildings, Manchester. Quantities by the architect :—

Jonathan Partington, Middleton Junction ... £11,745 (reduced).

[Nineteen tenders received.]

MILTON (Hants.).—For erecting a house, near Milton. Mr. C. McArthur Butler, architect, Boscombe :—

Miller & Son	£2,299 0	McWilliam & Son	£1,789 0
Jenkins & Son	1,845 0	Preston, Lymington*	1,698 10
		* Accepted.	

MORLEY (Yorks.).—Accepted for the construction of a service reservoir, Bruntcliffe, for the Corporation. Mr. Charles Gott, C.E., 8, Charles-street, Bradford :—

H. & E. Bower, Church-street, Halifax £8,138

ROSS (Herefordshire).—Accepted for the erection of four residences on the Ashfield Park estate, for Mr. John Start. Mr. Ernest G. Davies, architect, 6, St. John-street, Hereford :—

W. C. Taylor, Monmouth £2,400

[Lowest tender received.]

ROSS (Herefordshire).—Accepted for the erection of two pairs of semi-detached villa-residences on the Ashfield Park Estate, for Mr. John Hart. Mr. Ernest G. Davies, architect, 6, St. John-street, Hereford :—

W. C. Taylor, Monmouth (lowest tender received) ... £1,400

ROTHERHAM.—For the erection of club buildings, Moorgate-street. Mr. H. L. Tacon, architect, 11, Westgate-street, Rotherham :—

Thos. Roper	£1,667	A. T. Ripley	£1,560
Robert Snell	1,595	Chadwick & Co., Rother-	
Richd. Snell	1,583	ham (accepted)	1,560
W. Thornton & Son	1 577		

ROTHERHAM.—For forming, &c., Maltkiln-street, for the School Board. Mr. H. L. Tacon, surveyor, 11, Westgate, Rotherham :—

Chadwick & Co.	£463 0 0	A. T. Ripley	£284 0 0
Richard Morton	371 18 9	R. Hill, Rotherham *	240 0 0
J. E. Maden	330 17 0	* Accepted.	

ST. ALBANS.—For the formation of a new road between St. Albans and Smallford, for the Herts County Council. Messrs. Harding & Low, surveyors, St. Albans :—

T. Free & Sons	£850 0	T. Adams, Green-lanes	
J. Jackson	832 0	Good Station, Wood	
C. Miskin	762 0	Green, N.*	578 0
A. T. Catley	585 0	G. Capper	555 10
		G. Mann	475 0
		* Accepted.	

ST. LEONARDS.—For alterations, &c, to Nos. 30 and 31, King's-road, St. Leonard's-on-Sea, for Messrs. Wiseman & Co. Mr. William Cooper, architect, 21, Havelock-road, Hastings :—

A. H. White	£198 0	Padgham & Hutchinson	£159 0
Eldridge & Cruttenden	187 0	J. Perigoe,	
W. H. Eldridge & Son	182 5	St. Leonard's*	135 13
Vigor & Co.	175 0	* Accepted.	

SOUTHEND.—For the erection of a house at Southend, for Mrs. Corke. Mr. W. J. Wood, architect, 1, Finsbury Circus, E.C. :—

Dupont	£1,487 0 0	Darke	£1,295 0 0
Baker & Wiseman	1,363 13 0	Whin	1,272 0 0
Battley, Sons, & Holness	1,359 0 0	Woodhams	1,231 0 0
Davis & Leaning	1,342 0 0	Gooch	1,221 6 4

WROTHAM (Kent).—Accepted for new farm-house. Mr. H. Percy Monckton, architect and surveyor, 32, Walbrook, E.C. :—

S. Iggulden £380 12

LONDON SCHOOL BOARD TENDERS.

THE following lists of tenders were submitted by the Works Committee to the London School Board at their meeting on Thursday :—

FINSBURY (Gillespie-road).—Taking down old gallery, and providing and fixing a new pattern gallery in babies' room, also taking down gallery in class-room E, and continuing the stepped flooring, &c. :—

F. Britton	£122 10	McCormick & Sons	£96 10
W. Martin	122 0	Stevens Bros.	85 0
C. Dearing & Son	105 0	T. Cruwys*	82 0
Wake & Dean	99 0		
		* Recommended for acceptance.	

GREENWICH (Brockley-road).—Enlargement: boys, 118; girls, 118; infants, 120; total, 356 :—

W. Pattinson & Sons	£2,804	Kirk & Randall	£2 496
Walter Holt & Sons	2,780	J. & C. Bowyer	2,474
G. E. Wallis & Sons	2,674	E. P. Bulled & Co.	2,397
B. E. Nightingale	2,595	Mid-Kent Building & Con-	
Jas Smith & Sons	2,574	tracting Works, Ltd.*	2,365
J. & M. Patrick	2,539		
		* Recommended for acceptance.	

GREENWICH (Creed-place).—Rebuilding boys' and infants' offices; altering and refitting girls' offices; enclosing, draining, and tar-paving additional land and new drainage scheme :—

E. Proctor	£2,650	E. Triggs	£2,395
Atherton & Dolman	2,510	J. & C. Bowyer	2 394
W. Akers & Co.	2,477	Kirk & Randall	2,363
G. Parker	2.454	J. Otway*	2,179
W. V. Goad	2 396	* Recommended for acceptance.	

GREENWICH (Marsh-lane).—Providing tubular boilers and hot-water coils for heating two class-rooms in infants' department :—

Duffield & Co.	£62 0	J. & F. May	£48 0
W. J. Fox	51 0	J. C. & J. S. Ellis, Ltd.	42 10
Vaughan & Brown	51 0	J. Wontner-Smith, Gray,	
Hendry & Pattisson	48 0	& Co.*	36 0
		* Recommended for acceptance.	

SOUTHWARK (Goodson-road).—Erecting manual centre, providing halls and stock-rooms for all departments, new entrances and cloak-rooms for boys and girls, new lavatories for boys and infants, and additional cloak-room for infants :—

J. & M. Patrick	£4,597	D. Charteris	£4,248
Peacock Bros.	4,375	Holliday & Greenwood	4,161
Lathey Bros.	4,347	W. King & Son	4,153
W. Downs	4,325	C. Cox	4,098
T. L. Green	4,287	E. Lawrance & Sons*	4,046
B. E. Nightingale	4,256	* Recommended for acceptance.	

TOWER HAMLETS (Dalgleish-street).—Repairing stoves :—

R. H & J. Pearson, Ltd.	£48	Hendry & Pattisson*	£26
G. Miller	40	* Accepted.	

TOWER HAMLETS (Berner-street).—Providing and erecting an outside iron staircase :—

Ashton & Green Iron Co.	£50 0	Hayward Bros. & Eck-	
McDowall, Steven & Co.,		stein*	£44 10
Ltd.	49 0	* Recommended for acceptance.	

WEST LAMBETH (Haselrigge-road).—Providing upper standard rooms :—

Jas. Smith & Sons	£2,893	E. P. Bulled & Co.	£2,286
Holloway Bros.	2,828	Lathey Bros.	2,259
Hart Bros	2,418	J. & M. Patrick	2,235
W. Downs	2,357	B. E. Nightingale	2,223
G. E. Wallis & Sons	2,346	E. Triggs	2,220
J. Garrett & Son	2,345	I. Marsland	2,194
Holliday & Greenwood	2,323	Peacock Bros.*	2,118
		* Recommended for acceptance.	

WESTMINSTER ("Pulteney").—Taking down an old gallery and providing and fixing a new pattern gallery in babies' room, also taking down another gallery in class-room A, and continuing the stepped flooring, &c. :—

G. H. Rowe	£170 0	Wake & Dean	£104 0
F. G. Minter	135 0	W. Hornett	86 10
T. Nicholson	109 0	T. Cruwys*	82 0
		* Recommended for acceptance.	

WESTMINSTER (Head Offices).—Providing and fixing fittings to form additional plan room :—

G. M. Hammer & Co.	£113 10	Illingworth, Ingham & Co.	£98 8
J. Martin	110 0	E. Spencer & Co.	79 15
W. H. Lascelles & Co.	102 10	T. Cruwys*	70 0
		* Recommended for acceptance.	

WESTMINSTER (St. George's-row).—New school: Boys, 160; girls, 160; infants, 160; total, 480; including a schoolkeeper's house on arches, with playground for boys on roof :—

J. Longley & Co.	£20,958	Atherton & Dolman	£16,818
Hart Bros.	20,905	Treasure & Son	16,783
Holloway Bros.	20,741	J. Marsland	16,749
Lathey Bros.	17,718	D. Charteris	16,660
Killby & Gayford	17,536	J. & M. Patrick	16,464
J. Grover & Son	17.373	W. King & Son	15,066
T. Boyce	17,046	R. A. Yerbury & Sons*	14,365
		* Recommended for acceptance.	

GENERAL supply of moveable platforms :—

	4 ft. 6 in. by 6 ft.	6 ft. by 6 ft.
E. Spencer & Co.	£4 6 0	4 16 0
Rice & Son	4 0 0	5 0 0
G. M. Hammer & Co.	3 7 0	3 16 0
J. Martin	3 2 0	3 14 0
H. Bouneau	2 11 0	2 15 6
Foster, Cooper, & Foster	2 2 0	2 10 0
W. H. Lascelles & Co.*	2 0 9	2 8 6
	* Recommended for acceptance.	

TO CORRESPONDENTS.

"Nauticus" (St. Paul's is 365 ft. to the top of the cross, from general street level on south side. The other question we cannot answer).

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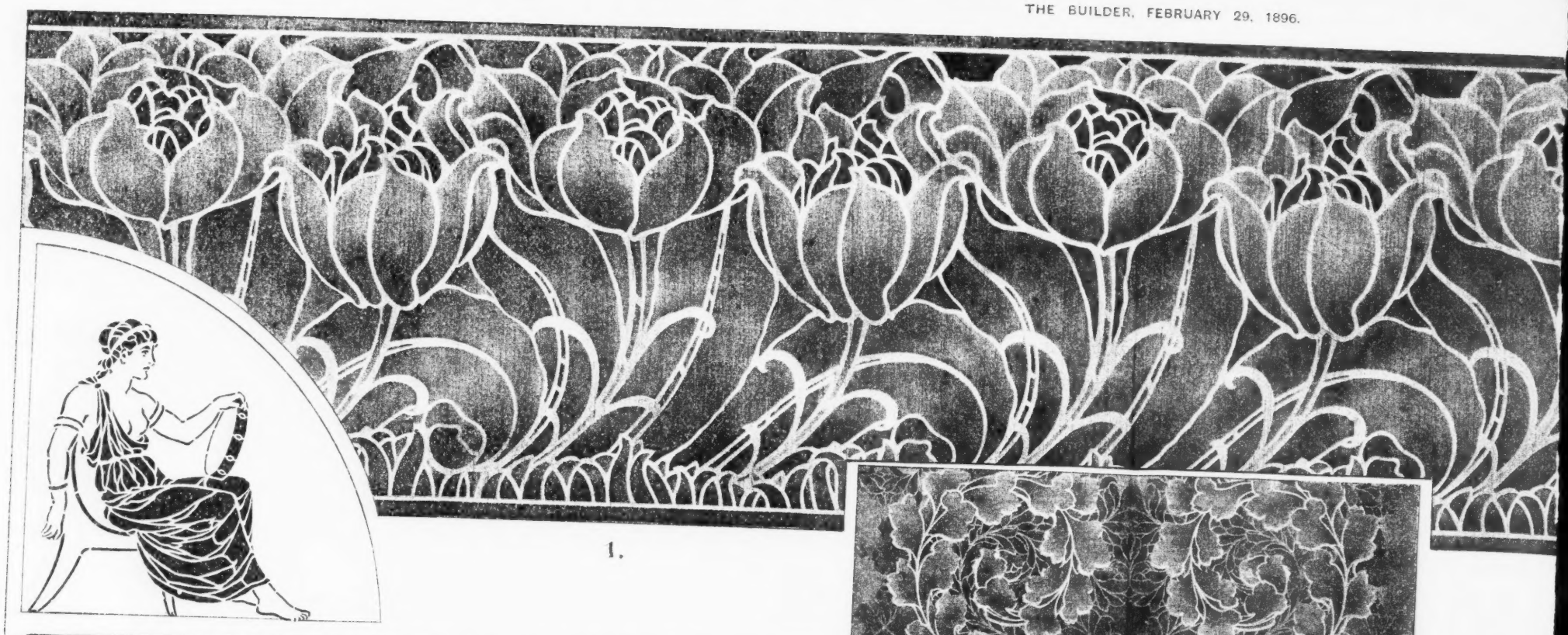

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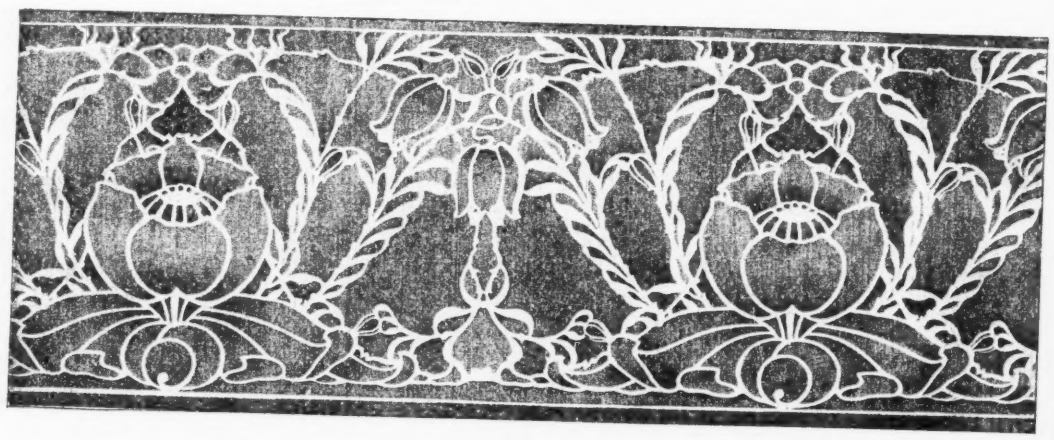

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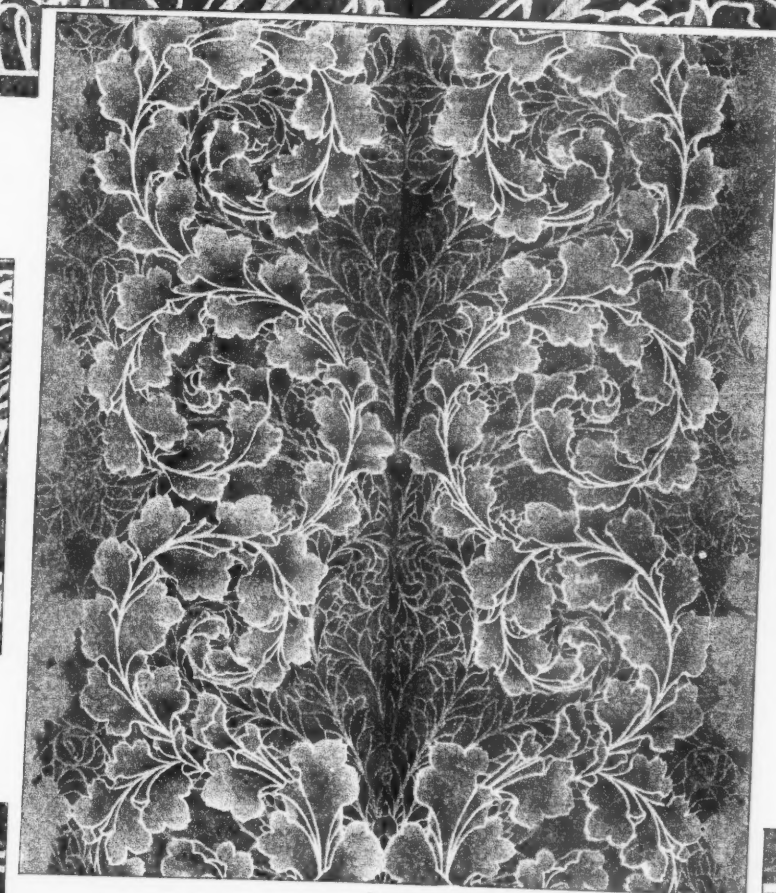

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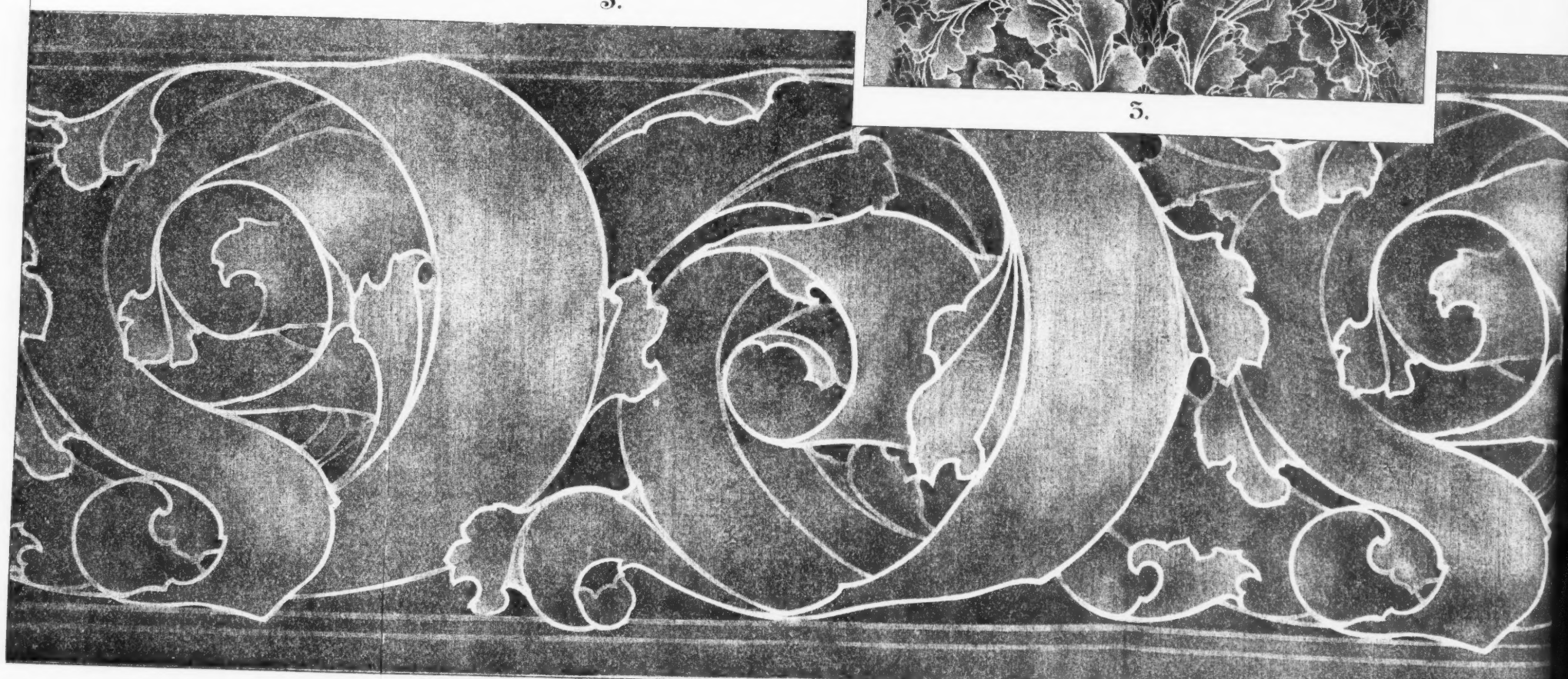

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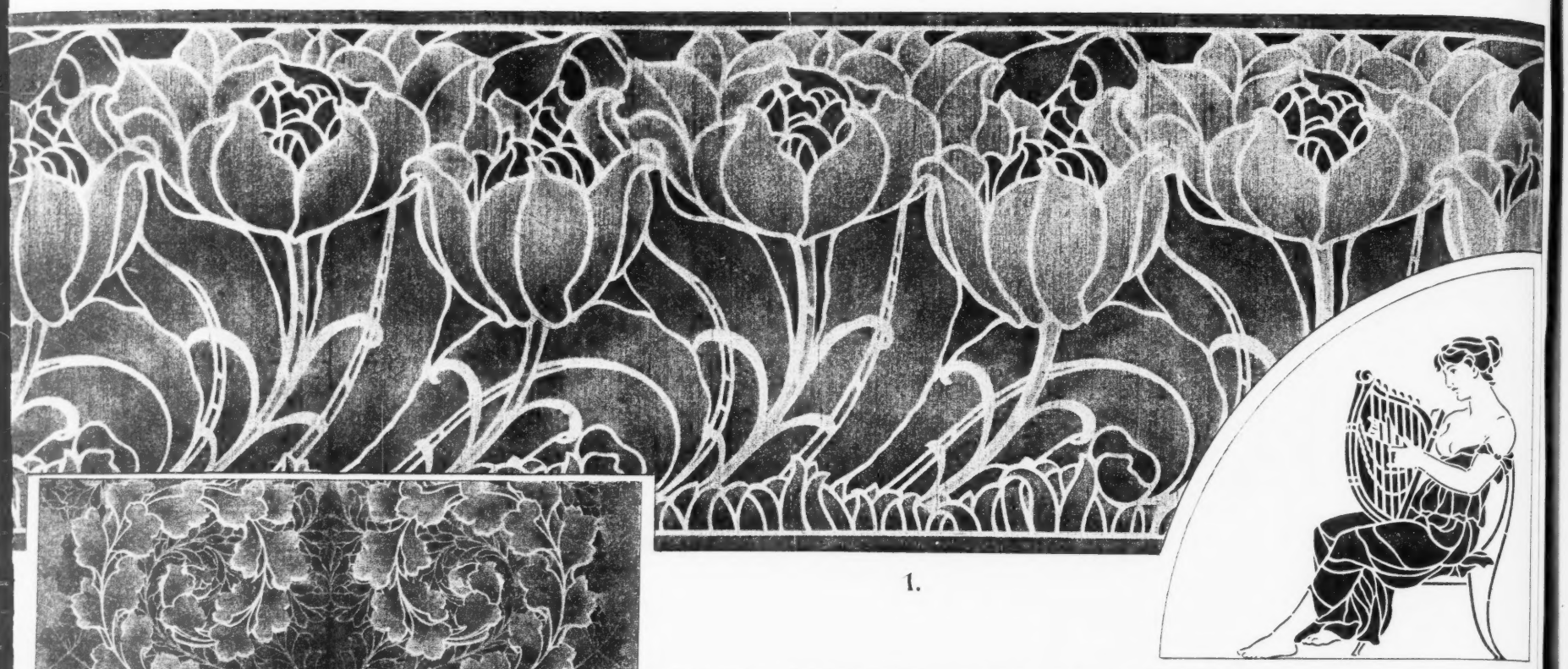

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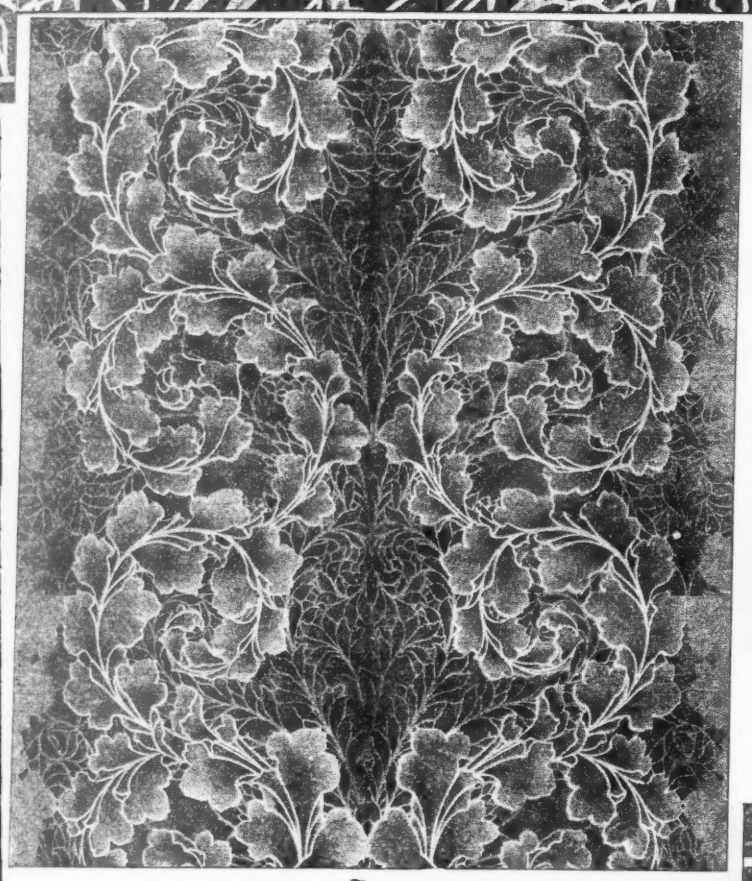

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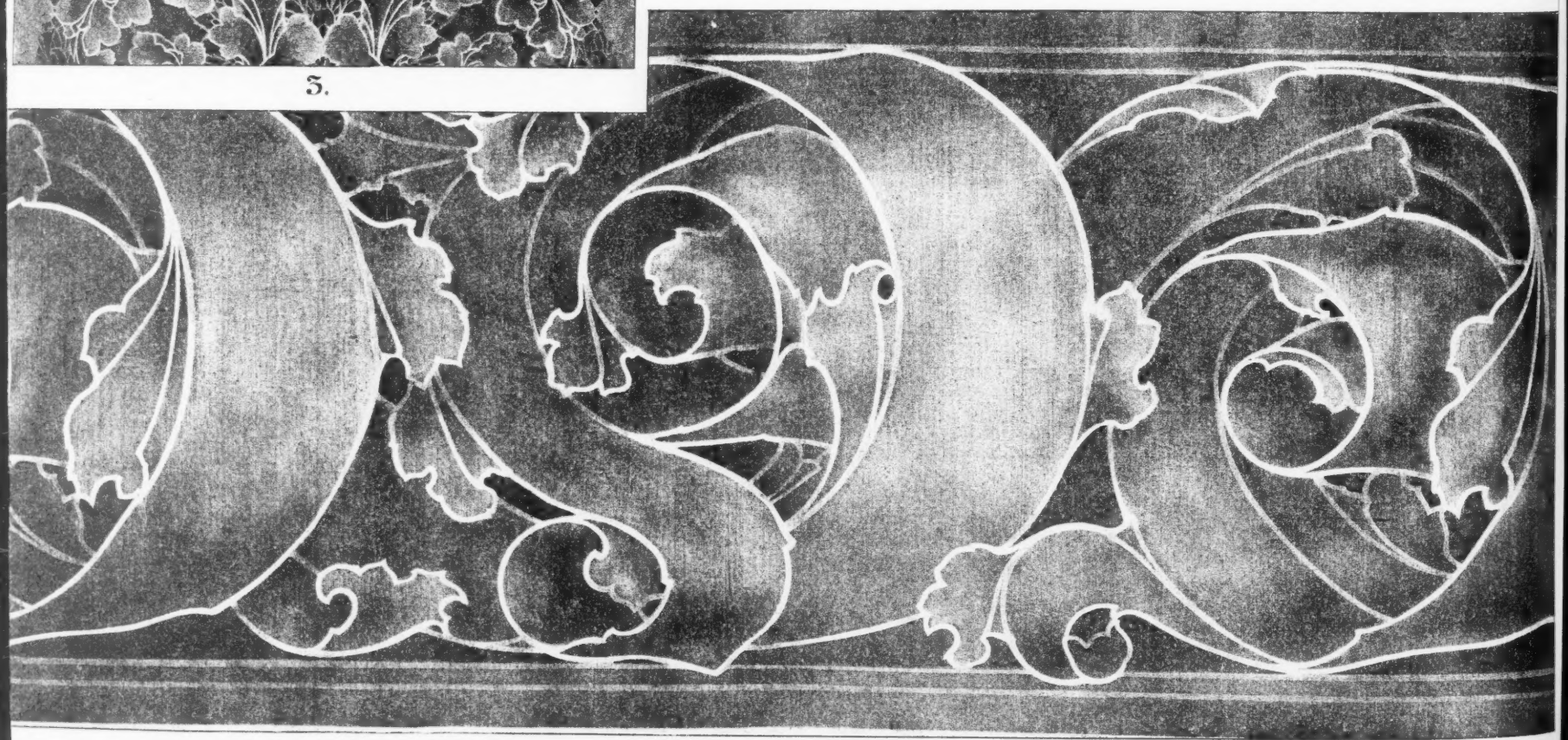

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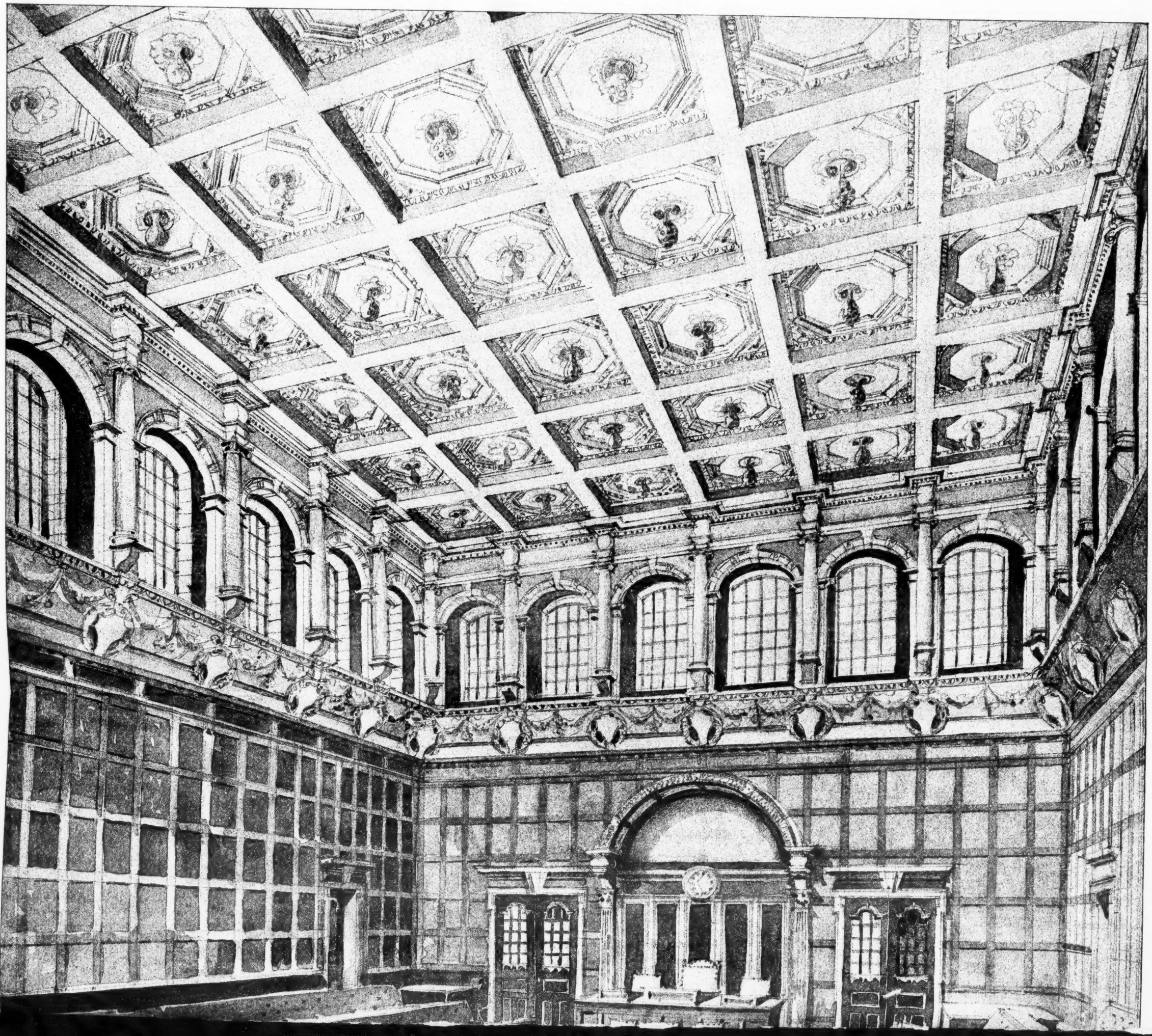

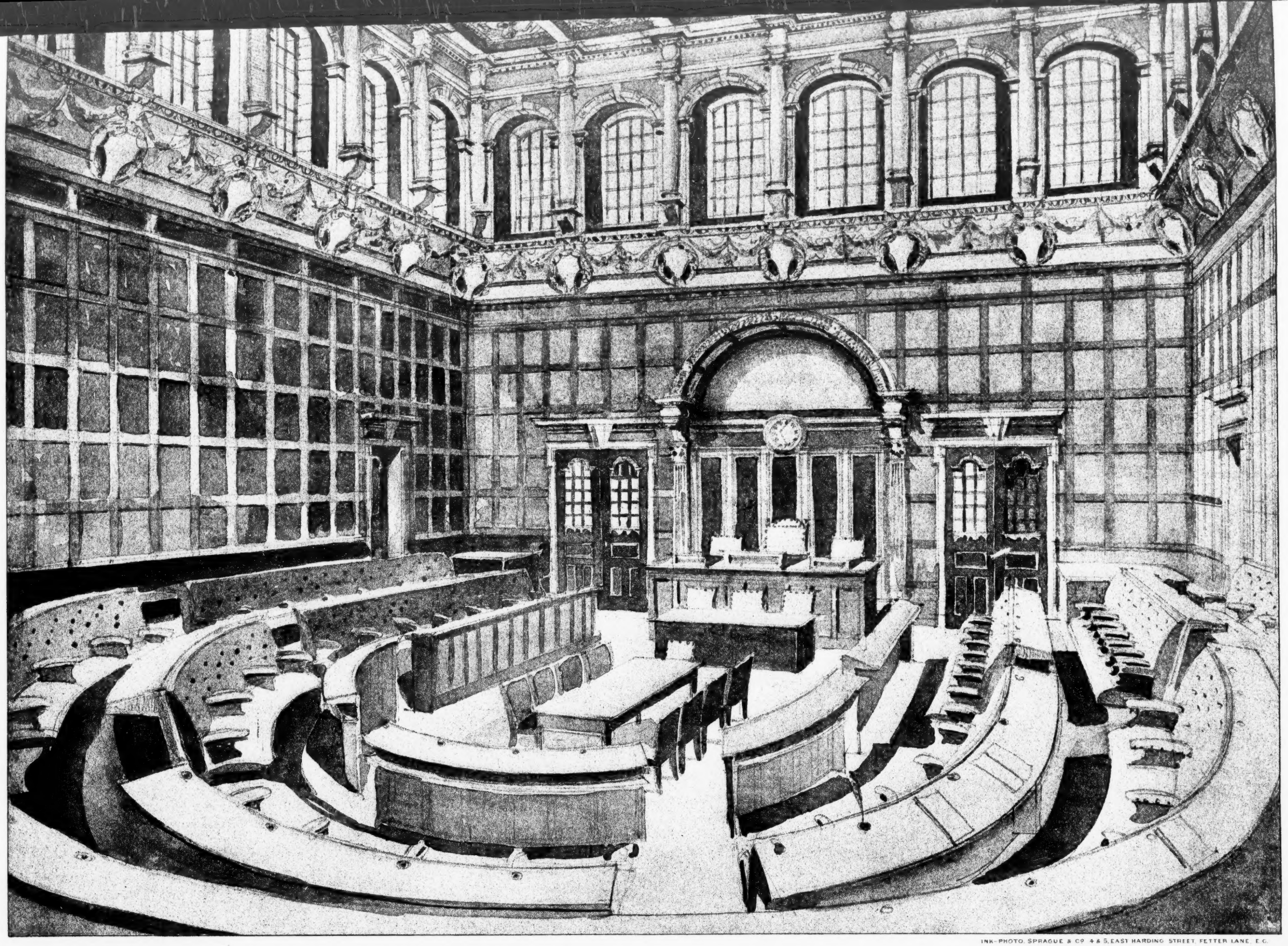

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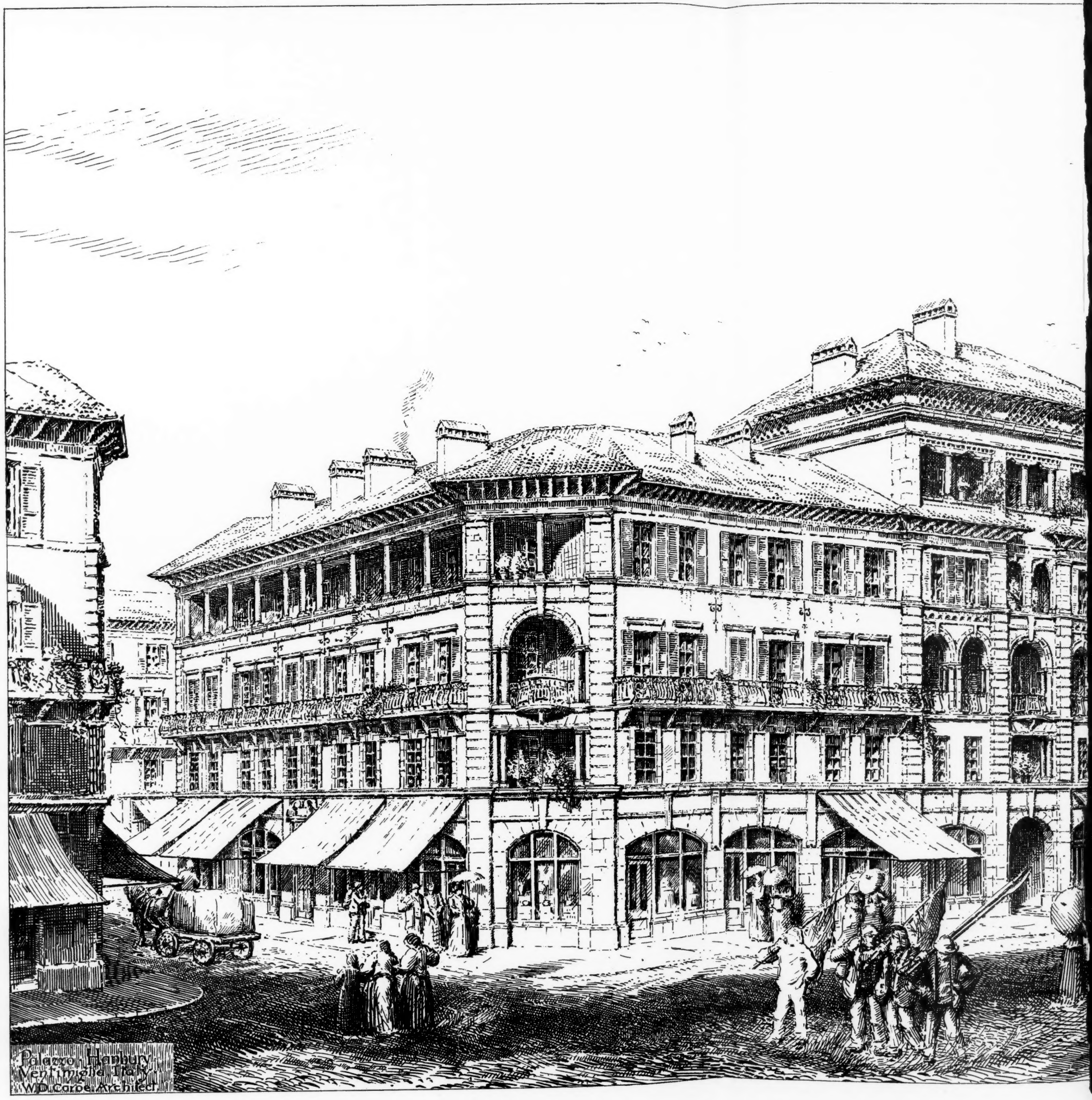
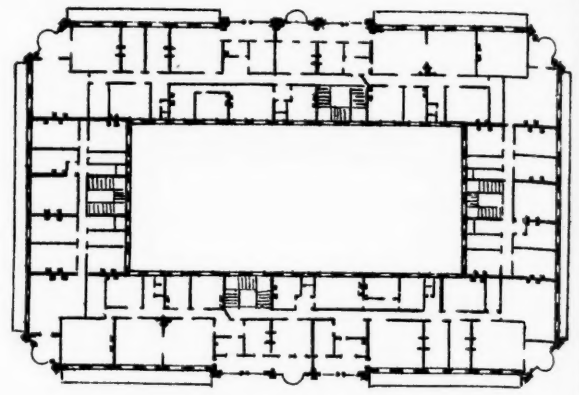
COMPETITION DESIGN FOR DURHAM MUNICIPAL BUILDINGS.—By Mr. A. T. Bolton, A.R.I.B.A., and Mr. A. N. Prentice, A.R.I.B.A.

INTERIOR OF COUNCIL-ROOM.



Palazzo Hanbury
Ventimiglia Italy
W.D. Caröe Architect



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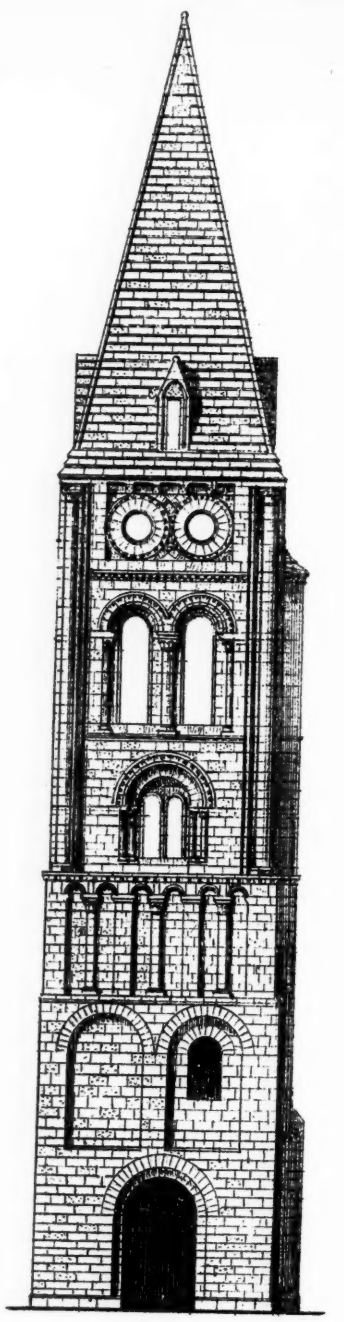

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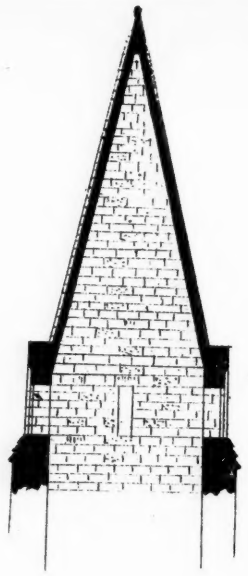

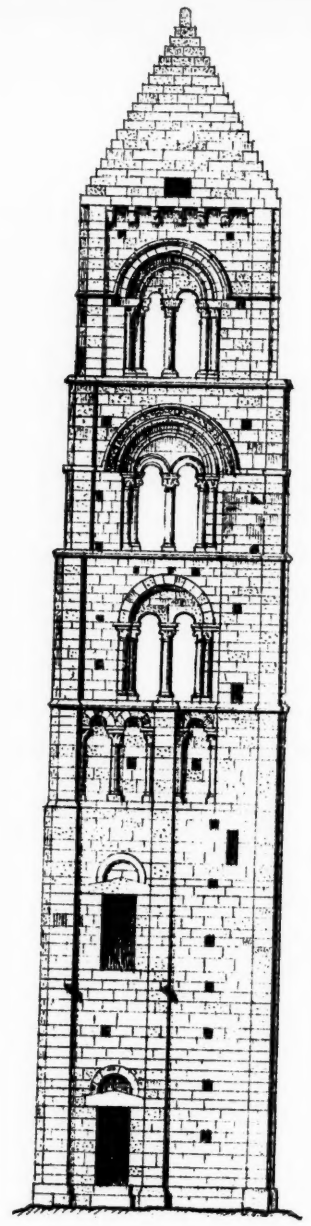

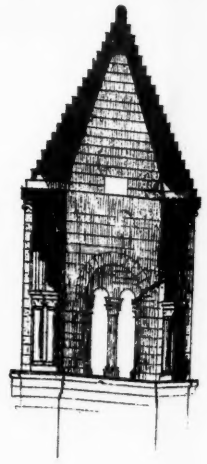

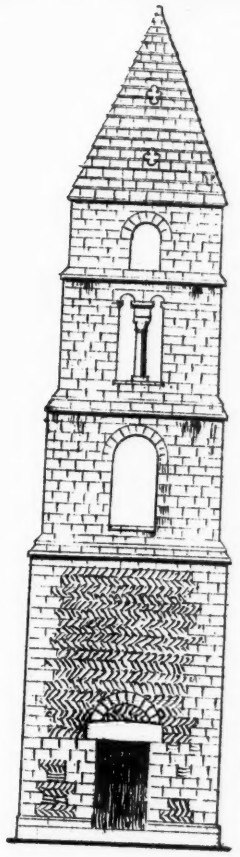

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VER.

(CALVADOS)

BIELLA. ITALY.

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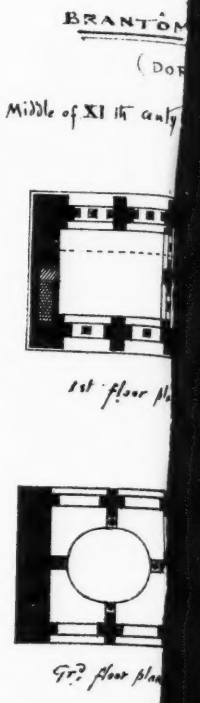
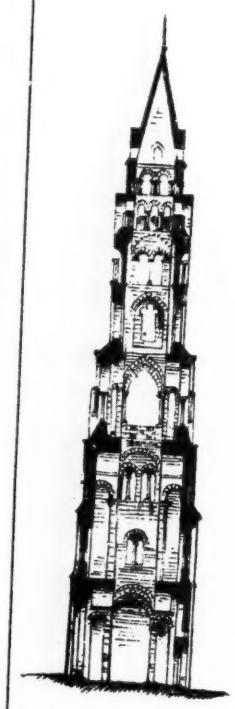


1st floor pl

Gr? floor plan

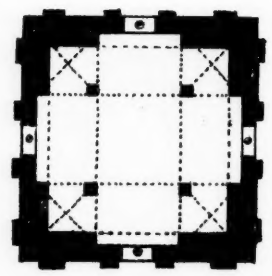


SECTION.

ELEVATION

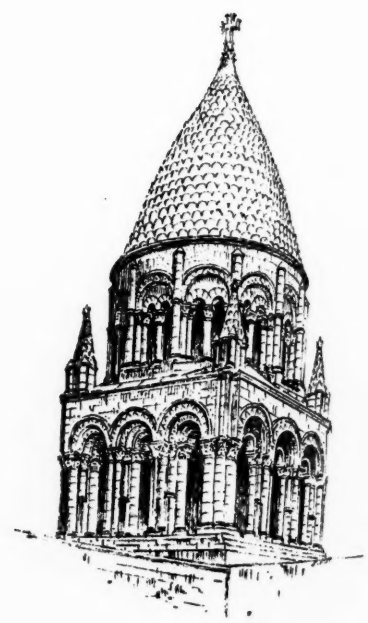
PUY-EN-VELAY

- End of XI. Cent?. -



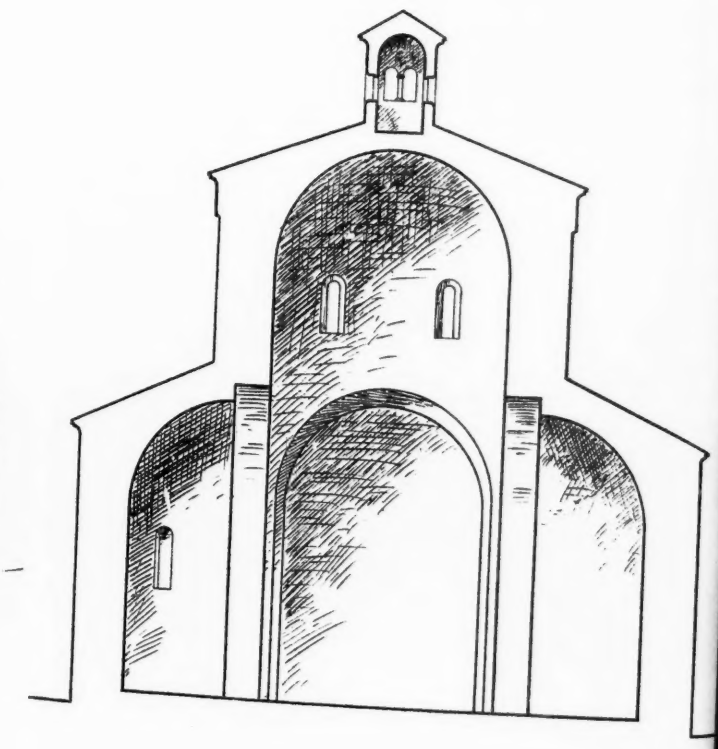
PLAN.

Scale of feet



SAINTES

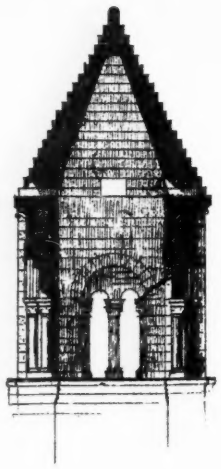
— End of XI. CENT!

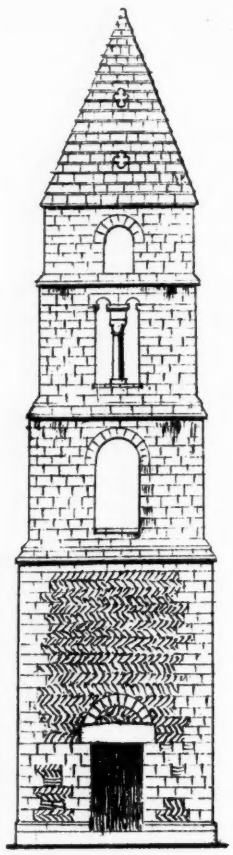


SECTION.

VER.

(CALVADOS)



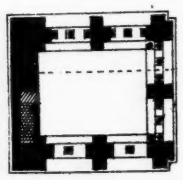


— ANGUERNY —

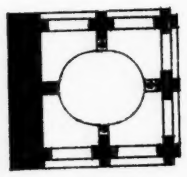
BRANTÔME

(DORDOGNE).

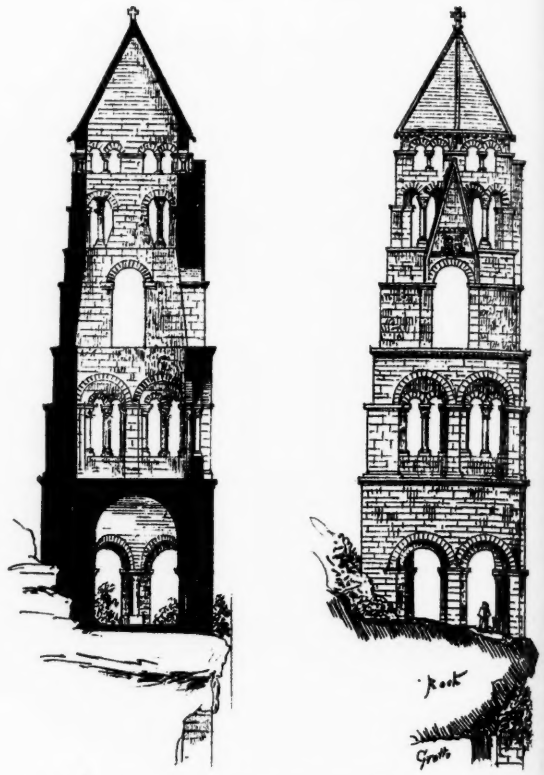
- Middle of XI th cent^y -



1st floor plan



Gr^d floor plan



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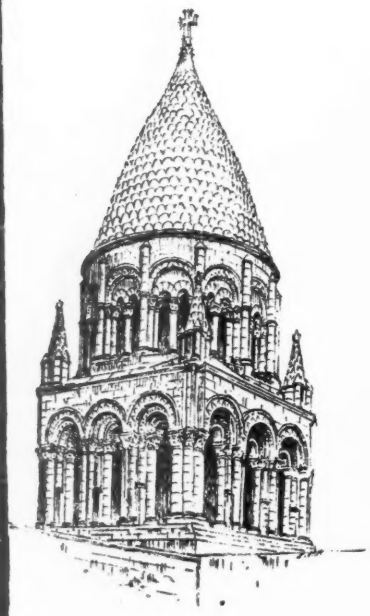
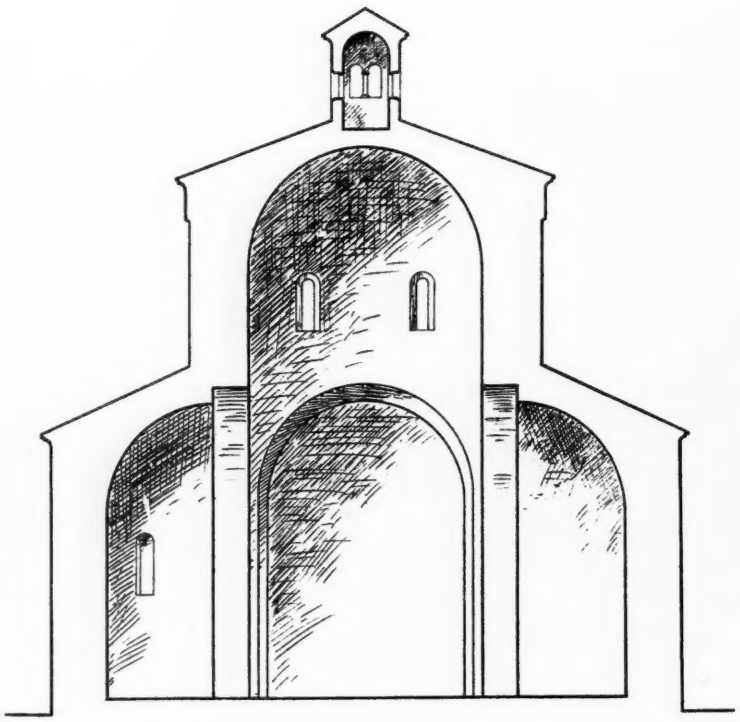
- IXTH OR XTH CENT^Y -



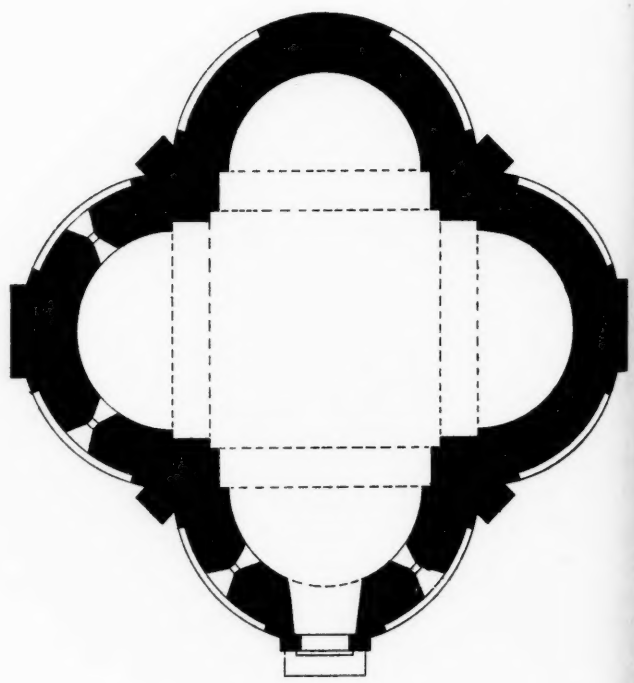
SAINTES

— End of XI CENT^Y



SECTION.

BIELLA. ITALY.



PLAN

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